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A STATISTICAL TABULATION OF THE RESULTS OF TREATMENT OF CARCINOMA OF THE TONGUE.[1]

By M. J. HOLMES, D.S.O., M.B., B.S., D.P.H.,
Senior Medical Officer, Commonwealth Department of Health.

THE tabulations now to be shown have been compiled from the figures supplied by eight large hospitals located in the six capital cities of Australia. These hospitals have been selected because they have for a number of years followed a uniform system for recording cases of cancer, and have carefully followed up the patients after they have left hospital, in order to ascertain accurately and to record the end results of the treatment applied.

This special system of recording and following up patients treated for cancer commenced in the year 1929 following the purchase and distribution of Commonwealth radium. It was at first limited to patients treated with radium, and was later extended to include patients treated by other radiation methods, and ultimately to patients treated surgically and by combined methods of surgery and radiation. By 1932 the system was in good running order, and it will be noted from the tables that by that year the number of patients lost to sight after treatment was very small. The tabulation of results of treatment covers the years 1929 to 1932. That is, only patients treated from six to three years ago are included.

The limitation of the tabulation to those hospitals in which a thoroughly efficient recording and follow-up system has been in operation over the period covered has necessarily reduced the number of cases of cancer of the tongue analysed, but the figures are, for this reason, thoroughly reliable. It must be recollected also that the figures relate to treatment carried out

[1] Read at the Seventh Australian Cancer Conference, Melbourne, May, 1936.

under the best possible conditions, in hospitals with fully equipped radiotherapeutic departments, and with every facility for the most modern treatment, surgical and radiological. The figures must therefore be looked upon as indicating optimum results under the methods of treatment in use from 1929 to 1932. Radiological techniques have improved since 1932, and combined methods of treatment, surgical and radiological, are coming more into use; and it is possible that present day results would show an improvement on those tabulated in this series.

The inquiry took into account not only the methods of treatment used and the results obtained, but also factors such as the history of the patient in regard to syphilis, and the age grouping of the patients.

In the actual compilation, separate tables were prepared for each method of treatment employed in the various stages of the disease, and for each year, so that figures are available of six, five, four and three year results for each method of treatment employed. Full sets of these tables have been circulated to the members of the Seventh Australian Cancer Conference. It would take too long to discuss these tables *seriatim*. It is proposed, therefore, to show a series of tables to bring out the main conclusions.

Table I indicates the proportion of patients treated for carcinoma of the tongue who gave a history of syphilis or a history strongly suspicious of syphilis. In the 298 cases analysed, 24·5% of patients gave such a history. This figure understates the proportion of patients with a syphilitic history, because, in an unknown but substantial proportion of the 298 cases analysed, no record has been made as to inquiry into a history of syphilis, nor had a Wassermann test been carried out in all instances.

TABLE I.

Carcinoma of the Tongue. Relation to Syphilis.

	Number of Cases.	Percentage.
A. Carcinoma developed on syphilitic site ..	13	4·4
B. Patient gave definite history of syphilis, although carcinoma may not have developed on syphilitic site	49	16·4
C. Patient gave history strongly suspicious of syphilis	11	3·7
Total cases with history of syphilis or strong suspicion of syphilis	73	24·5
Total cases analysed	298	

Table II indicates the extent to which the diagnosis of cancer of the tongue was confirmed by histological examination. In some of the hospitals concerned the proportion of patients in whom the diagnosis was confirmed by histological examination was between 80% and 90%. In others it was below 25%. For the 298 cases tabulated the proportion in which diagnosis was histologically confirmed was 52·7%.

In the tables now to be discussed the results of treatment are considered in relation to the stage in the disease which had been reached when treatment was first applied. The classification into stages

TABLE II.

Carcinoma of Tongue. Proportion of Total Cases Treated in which the Diagnosis of Carcinoma was Confirmed by Histological Examination.

Total Cases Treated.	Histologically Confirmed.	Proportion Histologically Confirmed.
298	157	52·7%

adopted in this connexion is in four stages, as shown in Table III. In applying this classification it is of course realized that there may be actual involvement of the regional lymph nodes without any perceptible enlargement.

TABLE III.

Carcinoma of the Tongue. Classification of Carcinoma of the Tongue into Stages according to the Anatomical Extent of the Growth.

Stage.	Anatomical Extent.
I	The carcinoma is limited to the tongue, and there is no involvement of the regional lymph nodes.
II	The carcinoma involves the tongue and floor of mouth, and there is no involvement of the regional lymph nodes.
III	There is clinical evidence of involvement of the regional lymph nodes secondary to carcinoma of the tongue.
IV	The carcinoma has extended from the tongue and the floor of the mouth to the neighbouring bone.

In Table IV the methods of treatment used and the relative frequency of use of each method are indicated.

Radium first became available to the hospitals concerned in 1928, following the purchase and distribution of ten grammes of radium by the Commonwealth Department of Health. The distribution of this radium was not complete until 1929, and consequently very few patients were treated with radium in 1928. At that time also the records of patients treated surgically were very incomplete, no special recording or follow-up system having been introduced. Consequently the number of patients shown as treated for carcinoma of the tongue in that year (1928) is probably little more than half the number actually treated. In this and subsequent tables, although the figures for each method of treatment are indicated separately, there is also a division by heavy lines into (i) patients treated by radiation methods, 176 out of 282=63%; (ii) patients treated by combined surgery and radiation, 81 out of 282=28%; (iii) patients treated by surgical methods, 25 out of 282=9%.

It will be noted that in 1929, when radium came into use, the radiation treatment consisted in a large proportion of cases in the application of radium to the tongue alone, 27 cases out of a total of 62 treated. In 11 cases radium to the tongue was supplemented by excision of the glandular area. In subsequent years the majority of patients were treated by radium to the tongue *plus* irradiation or excision of the glandular area, or both. It will be noted, however, that in 1932 there was a very sharp drop in the number of patients treated by the application of radium to the tongue, *plus* excision of the glandular area. In that year only five patients out of 62 were so treated. A correspondingly higher proportion of patients was treated purely by radiation methods (45 out of 62).

TABLE IV.
Carcinoma of Tongue. Methods of Treatment Used.

	Treatment.	1928.	1929.	1930.	1931.	1932.	Total 1929 to 1932.	
Radiation.	Radium to tongue only	3	27	20	30	22	99	
	Radium to tongue. Irradiation of glands	1	9	24	21	22	76	176
	Deep therapy only					1	1	
Combined.	Radium to tongue. Excision of glands	1	11	13	24	5	53	
	Radium to tongue. Excision and irradiation of glands		5	5	6	4	20	81
	Surgery and radiotherapy	3	3	2	2	1	8	
Surgery.	Surgery, tongue only	7	3	1	5	1	10	
	Surgery, tongue and glands	14	3	2	3	6	14	25
	Surgery and diathermy	5	1				1	
	Total	34	62	67	91	62	282	

The figures for 1932 show a falling off in all procedures involving combined surgical and radiation treatment. Bearing in mind the importance of complete collaboration between surgeons and radiologists in the selection of methods of treatment, it will be a matter of important practical interest to ascertain whether, since 1932, there has been a reversion to combined methods of treatment or whether increasing reliance continues to be placed on radiation alone in a high proportion of the patients treated. In this connexion considerations of blood supply in relation to areas subjected to radiation are involved.

The stage at which the disease is treated bears, of course, a strong relationship to the particular method of treatment selected, and Table V indicates the relative frequency of employment of the several methods of treatment at the various stages of the disease. The figures given in this table are the combined figures for the years 1929 to 1932.

It will be noted that the great majority of the patients treated in Stage I of the disease (50 out of 82) were treated by means of radium applied only to the tongue. In 12 cases the glandular area was also irradiated.

Thus, in the case of 62 out of 82 patients treated in Stage 1, irradiation only was employed. In the case of 10 patients out of the 82 the irradiation of the tongue was supplemented by excision of the glandular area. Surgery only was employed in eight instances.

In Stage 2 of the disease the glandular area received more attention, and a larger proportion of cases was treated by combined surgery and radiation.

In Stage 3, extension to the regional lymph nodes having become clinically obvious, the glandular area received attention in the great majority of the cases, either by irradiation of the glandular area (39 out of 128) or by surgical excision (34 out of 128), or by both (12 out of 128).

Still, in a considerable proportion of cases (26 out of 128) no treatment was given beyond irradiation of the tongue itself; and it must be presumed that, bearing in mind the age and physical condition of the patients (many of whom were well over seventy years of age) and the slight prospect of influencing the course of the disease, little more than palliative treatment was attempted. This applies also to Stage 4 of the disease, in which the main recourse is to irradiation without surgery.

TABLE V.
Carcinoma of Tongue. Methods of Treatment Employed at Various Stages of the Disease.

	Method.	Stage I.	Stage II.	Stage III.	Stage IV.	Total.
Radiation.	Radium to tongue only	50	11	26	12	99
	Radium to tongue. Irradiation to glands	12	6	39	19	76
Combined.	Radium to tongue. Excision of glands	10	7	34	2	53
	Radium to tongue. Excision and irradiation of glands	2	3	12	3	20
	Surgery and radiotherapy			7	1	8
Surgery.	Surgery, tongue only	1	2	4	3	10
	Surgery, tongue and glands	7	1	6		14
	Total	82	30	128	40	280

In Table VI the results of treatment by various methods are indicated in respect of patients treated in the first and second stages of the disease, that is in the stage before any clinical evidence has appeared of extension of the disease to the regional lymph nodes.

In this table "Alive" indicates patients alive at the date of compilation (January, 1936).

Of patients whose only treatment was by radium to the tongue, the position is as follows:

Survival after seven years: Nil out of 3 cases.
Survival after six years: 2 out of 15 cases.
Survival after five years: 3 out of 15 cases.
Survival after four years: 4 out of 17 cases.
Survival after three years: 7 out of 14 cases.

The survivals in respect of patients treated by other methods are similarly indicated.

It will be noted, for example, that in respect of the 1931 cases the number of survivals is four out of 17 (or 23%) when radium to the tongue alone was the method of treatment employed. When the application of radium to the tongue was supplemented by irradiation of the glandular area or by excision of glands or by both irradiation and excision of the glandular area, the survivals were nine out of 15 patients so treated (60%). This improvement in the survival rate occurs in spite of the fact that the patients treated by radiation applied to the tongue alone are presumably in the very earliest stages of the disease, whereas those treated by irradiation or excision of the glandular area in addition to irradiation of the tongue have presumably reached a somewhat later stage in the disease. The position in this respect is, however, not so favourable for years other than 1931, and this indicates the weakness of drawing conclusions from any one year's figures.

The number of patients treated by surgery alone in the first and second stages of the disease is relatively small, and the results do not appear to be so favourable as those obtained in the case of patients treated by radiation methods or by combined surgery and radiation.

Taking all methods of treatment into consideration, the position as regards patients treated in the first and second stages of the disease is as follows:

1928 (seven years), 1 survival out of 14=7%.
1929 (six years), 4 survivals out of 26=15%.
1930 (five years), 5 survivals out of 24=20%.
1931 (four years), 14 survivals out of 36=39%.
1932 (three years), 9 survivals out of 26=31%.

In Table VII the figures from Table VI have been combined for the years 1929 to 1932. The survivals represent, therefore, those patients treated by various methods in the first and second stages of the disease who still remain alive three to six years after treatment.

Of 61 patients whose only treatment was the application of radium to the tongue, 16 (26%) remain alive. The proportion surviving after treatment by radium applied to the tongue together with irradiation of the glandular area is 33%. Only five patients were treated by radium applied to the tongue *plus* surgical removal of glands and irradiation of the glandular area, but of these two survive (40%). The results of treatment by surgery alone are less favourable.

Taking the combined figures for all methods of treatment, we find that of 112 patients treated in the first and second stages of the disease, 32 (28%) were known to be alive three to six years later.

Table VIII supplies figures of the results of treatment by various methods in respect of patients treated in the third and fourth stages of the disease, that is, in the stages when clinical evidence is apparent of extension to the regional lymph glands, or (Stage 4) of involvement of neighbouring tissues including bone.

TABLE VI.

Carcinoma of Tongue. Position at end of 1935 of Cases Treated from 1928 to 1932. First and Second Stages of the Disease.

	Method of Treatment.	1928. (Seven Years.)			1929. (Six Years.)			1930. (Five Years.)			1931. (Four Years.)			1932. (Three Years.)		
		Alive.	Dead.	Uncertain.	Alive.	Dead.	Uncertain.	Alive.	Dead.	Uncertain.	Alive.	Dead.	Uncertain.	Alive.	Dead.	Uncertain.
Radiation.	Radium to tongue only		1	2	2	11	2	3	7	5	4	10	3	7	6	1
	Radium to tongue. Irradiation of glands				1	1		2	5		2	1	1	1	4	
Combined.	Radium to tongue. Excision of glands					5				1	5	3	1	1		1
	Radium to tongue. Excision and irradiation of glands					1					2				2	
	Surgery and radiotherapy															
Surgery.	Surgery, tongue only		2	3		1	1						1			
	Surgery, tongue and glands	1	1	4	1				1		1	2			3	
	Total	1	4	9	4	19	3	5	13	6	14	16	6	9	15	2
	Grand total, 126	14			26			24			36			26		

TABLE VII.

Carcinoma of Tongue. Position at end of 1935 of Cases Treated from 1929 to 1932. First and Second Stages of Disease.

	Method.	Alive	Dead.	Uncertain.	Total.	Percentage of Survivals.
Radiation.	Radium to tongue only	16	34	11	61	26
	Radium to tongue. Irradiation of glands	6	11	1	18	33
Combined.	Radium to tongue. Excision of glands	6	8	3	17	35
	Radium to tongue. Excision and irradiation of glands	2	3		5	40
	Surgery *plus* radiotherapy					
Surgery.	Surgery, tongue only		1	2	3	Nil
	Surgery, tongue and glands	2	6		8	25
	Total	32	63	17	112	28

It will be noted that, although the stage of the disease is late, a considerable proportion of the patients have received no treatment other than application of radium to the tongue alone. As already indicated, these are probably patients advanced in age or in whom the disease has progressed to a stage when little can be done beyond palliative treatment.

A study of the figures will show that the results obtained by this limited treatment are at least as good as those obtained by a more extensive field of treatment embracing irradiation of the glandular area or combined surgical and radiation treatment. In fact, at this stage of the disease no method of treatment is of much avail in effecting a cure.

Taking all methods of treatment into consideration the position as regards patients treated in the third and fourth stages of the disease is as follows:

1929 (six years), 1 survival out of 35=3%.
1930 (five years), 4 survivals out of 43=9%.
1931 (four years), 3 survivals out of 55=5%.
1932 (three years), 4 survivals out of 35=11%.

The same conclusion is brought out in Table IX. Here the figures for the years 1929 to 1932 are combined, and it is seen that the percentage of survivals from three to six years after treatment varies from 11%, when the only treatment given is radium applied to the tongue alone, to 5%, when the irradiation of the tongue is combined with surgical excision of the glandular area. Treatment by surgical measures alone showed no survivals three years or more after the operation.

Taking all methods of treatment into consideration, we find that of 168 patients treated in the third and fourth stages of the disease, 12 (7%) remained alive from three to six years after treatment.

TABLE VIII.

Carcinoma of Tongue. Position at end of 1935 of Cases Treated from 1928 to 1932. Third and Fourth Stages of Disease.

	Method.	1928. (Seven Years.)			1929. (Six Years.)			1930. (Five Years.)			1931. (Four Years.)			1932. (Three Years.)		
		Alive.	Dead.	Uncertain.	Alive.	Dead.	Uncertain.	Alive.	Dead.	Uncertain.	Alive.	Dead.	Uncertain.	Alive.	Dead.	Uncertain.
Radiation.	Radium to tongue only					10	2		4	1	2	10	1	2	6	
	Radium to tongue. Irradiation of glands		1		1	6		1	16		1	16		1	16	
Combined.	Radium to tongue. Excision of glands		1			4	2	2	8	2		9	6		3	
	Radium to tongue. Excision and irradiation of glands					4			5			4		1	1	
	Surgery *plus* radiotherapy		1	2		2	1	1	1			2			1	
Surgery.	Surgery, tongue only		1	1		1			1			2	2		1	
	Surgery, tongue and glands	1	5	2		1	1		1						2	1
	Total	1	9	5	1	28	6	4	36	3	3	43	9	4	30	1
	Grand total, 183		15			35			43			55			35	

TABLE IX.

Carcinoma of Tongue. Position at end of 1935 of Cases Treated from 1929 to 1932. Third and Fourth Stages of Disease.

	Method.	Alive.	Dead.	Uncertain.	Total.	Percentage of Survivals.
Radiation.	Radium to tongue only	4	30	4	38	11
	Radium to tongue. Irradiation of glands	4	54		58	7
Combined.	Radium to tongue. Excision of glands	2	24	10	36	5
	Radium to tongue. Excision and irradiation of glands	1	14		15	7
	Surgery and radiotherapy	1	6	1	8	12
Surgery.	Surgery, tongue only		5	2	7	Nil
	Surgery, tongue and glands		4	2	6	Nil
	Total	12	137	19	168	7

These figures, which apparently indicate the best results obtainable in well equipped treatment centres several years ago, cannot at first sight be considered encouraging. They must, however, be considered in the light of several important factors. As will be shown later, a considerable proportion of the patients come under treatment at an advanced age, when the patient's physical condition permits of little more than palliative treatment. Again, a very high proportion of the patients (approximately 60% of all patients with carcinoma of the tongue) present themselves for treatment when the disease has already invaded adjacent tissues and has extended to the regional lymph nodes.

In the first and second stages of the disease we have seen (Tables VI and VII) that 50% of patients treated by the application of radium to the tongue alone survive for three years, and 20% survive for five years. Over a period of three to six years after treatment survivals range from 26% to 40%, according to the method of treatment employed. Again, taking into consideration the advanced age of many of the patients, these figures are not without encouragement.

But apart from the criterion of length of survival after treatment, the results must be considered also from the point of view of the patient's condition during the months or years of life which remain. In Table X an analysis is made of patients dead at the end of 1935 who were treated from three to seven years earlier. It will be noted that of the 47 patients treated in Stage 1 and who have died, 12 (25%) died without any evidence of recurrence or secondary extension. In 18 cases (40%) the primary lesion had healed and death was due to secondary extension.

Thus in 65% of cases the patient, although he died, received very appreciable benefit. Even in the third and fourth stages of the disease, in 61 cases out of 146 the patient died either without recurrence or secondary extension, or died of secondary extension, the primary lesion having healed.

This in itself, in the case of these patients, most of whom are well advanced in years, is an important consideration. Although life may be prolonged only for a year or two, there is great relief from pain, suffering and distress in what short period of life remains. The clearing up of the mouth condition, retaining the tongue, must create inestimable relief for the patient.

TABLE X.

Carcinoma of Tongue. Analysis of Patients Dead at end of 1935 who were Treated 1928 to 1932.

Stage at which Treatment was Given.	Died of Other Causes Without Evidence of Recurrence or Secondary Extension.	Primary Healed. Died of Secondary Extension.	Palliative Relief Only.	Died Without Improvement.	Total.
I	12	18	3	14	47
II	4	3	5	8	20
III	3	39	21	47	110
IV	4	15	4	13	36
Total..	23	75	33	82	213

The figures already given of the results of treatment would appear to indicate that, in the later stages of the disease, irradiation alone gives results equally as good as more drastic methods; and has the advantage of being more acceptable to the patient.

Table XI presents an analysis of patients treated in 1928 to 1932 and who still survived at the end of 1935.

Of 280 patients treated between 1928 and 1932, 46 survived at the end of 1935. Of these 46 patients who have survived, 43 (94%) have shown no evidence of recurrence, and none have shown any evidence of secondary extension. Thirteen of these 46 patients were treated in the later stages of the disease, and in none of these was there any evidence of local recurrence or secondary extension after three to seven years.

Of course it is realized that should any patient now surviving develop a local recurrence or should secondary extension of the disease occur, the probabilities are that a rapidly fatal result may ensue. Consequently such patients would quickly become transferred from the category of patients alive but with evidence of recurrence or secondary

TABLE XI.

Carcinoma of Tongue. Analysis of Patients Treated from 1928 to 1932 Surviving at end of 1935.

Length of Time Elapsed Since Treatment Given.	Treatment Given in Stage I or Stage II.	Evidence of Subsequent		Treatment Given in Stage III or Stage IV.	Evidence of Subsequent	
		Recurrence.	Secondary Extension.		Recurrence.	Secondary Extension.
Seven years	1	1	Nil	1	Nil	Nil
Six years	4	Nil	Nil	1	Nil	Nil
Five years	5	Nil	Nil	4	Nil	Nil
Four years	14	2	Nil	3	Nil	Nil
Three years	9	Nil	Nil	4	Nil	Nil
Total	33	3	Nil	13	Nil	Nil

extension, to the category of those dead from the disease. This fact tends to keep the figures low in the category of those alive but with evidence of recurrence or secondary extension.

Nevertheless, we are in a position to say that approximately 30% of patients treated in the first and second stages of the disease do, in spite of their age, either become cured, or survive for a period of three to seven years without recurrence or secondary extension, and that even though in a high proportion of cases a fatal issue is not averted, the suffering and distress of the last years or months of life are greatly alleviated by modern methods of treatment, and the patient lives and dies in comparative comfort. This marks a great advance over the situation of only a few years ago.

Table XII indicates the ages of patients suffering from carcinoma of the tongue when they presented themselves for treatment. 27% are under age sixty years, 73% are over age sixty years, and 31% are over age seventy years.

TABLE XII.

Carcinoma of Tongue. Age at which Treatment was Commenced.

Age Group. (Years.)	Number of Cases.	Percentage in Age Group.		
Under 45	12	4·0	27%	
45 to 49	9	3·0		
50 to 54	23	7·7		
55 to 57	36	12·1		
60 to 64	63	21·1	42%	73%
65 to 69	63	21·1		
70 to 74	48	16·2	31%	
75 to 79	25	8·4		
80 and over ..	16	5·4		
Not stated	3	1·0		

At these ages a high rate of survival above a comparatively short period is hardly to be expected even when the disease is treated in its early stages. As a matter of fact, as shown in Table X, quite a considerable proportion of the patients treated in Stage 1 of the disease die without evidence of recurrence or of secondary extension.

Tables XIII and XIV indicate the stage reached by the disease before patients suffering from carcinoma of the tongue come under treatment. The number of patients coming under treatment in each stage of the disease year by year from 1928 to 1932 is shown in Table XIII. In Table XIV the same information is set out in the form of percentages.

TABLE XIII.

Carcinoma of Tongue. Stage at which Disease came under Treatment.

Year.	Stage I.	Stage II.	Stage III.	Stage IV
1928	14	2	17	1
1929	15	11	27	9
1930	22	2	32	11
1931	27	9	45	10
1932	18	8	27	11
Total 318	96	32	148	42

TABLE XIV.

Carcinoma of Tongue. Stage at which Disease came under Treatment shown as a Percentage of Total Cases Treated in each Year.

	1928.		1929.		1930.		1931.		1932.	
Stage I ..	42	47	24	42	33	36	30	40	28	40
Stage II ..	5		18		3		10		12	
Stage III ..	50	53	44	58	47	64	49	60	43	60
Stage IV ..	3		14		17		11		17	

It will be noted that of 318 patients treated in the years 1928 to 1932, one hundred and ninety (60%) had reached the third or fourth stage of the disease before treatment was commenced.

The position in 1932 shows no improvement over that in 1928 in this respect. The percentage of patients presenting for treatment in Stages 1 and 2 for the respective years 1928 to 1932 is 47, 42, 36, 40 and 40. For the same years the percentage presenting in Stages 3 and 4 is 53, 58, 64, 60 and 60.

Figures have not yet been collected to ascertain whether since 1932 the efforts made to bring patients earlier under treatment have met with success. Nor is it known whether, in Queensland, where continuous attention has for some years been given to public education in relation to cancer, particularly from the point of view of encouraging patients to seek advice early, the percentage of patients coming under treatment in the first and second stages of the disease is greater than in the other States.

In the case of an accessible region such as the tongue, it certainly should be possible to insure that the disease comes earlier under attention in a high proportion of cases. In 60% of all patients suffering from carcinoma of the tongue obvious secondary extension has already occurred before the disease is diagnosed and treated. This fact cannot be accepted with equanimity.

Properly selected treatment in the early stages meets with a good measure of success considering the advanced age of many of the patients. Treatment in the later stages is of little avail in saving or prolonging life.

Among much that is very difficult of solution in the field of cancer there are many avenues along which we can progress with the knowledge we already possess. One of these avenues surely is the earlier diagnosis and early application of properly selected treatment in the case of accessible cancer, such as that of the tongue. The position calls for persistent but tactful action to bring about more adequate appreciation by the public of the necessity for seeking advice immediately a suspicion is raised; and the removal of the fear complex by informing the public regarding the means of treatment available and the prospects of cure if the disease is treated sufficiently early.

Added to this is the need for constant watchfulness on the part of medical practitioners for the earliest indication or suspicion of malignancy and the removal of possible causative factors.

In this connexion there should be widespread provision of facilities to enable early diagnosis to be made and appropriate treatment selected, and a linking up of the whole medical profession with these facilities so that the general practitioner may give his patient the full benefit of them immediately he has reason to suspect the need.

As regards the selection and application of the method of treatment most suited to any particular case, a plea is made for the closest collaboration between surgeon and radiologist. In many cases of cancer the best prospects of successful treatment lie in a suitable combination of surgery and radiation therapy. In the fullest exploitation of this field much is possible in the interests of the patient.

As stated earlier in this paper, the statistical figures given have been extracted from a series of more detailed tables compiled from returns received from various hospitals, and setting out results obtained by each method of treatment in the various stages of the disease for each of the years under review. Separate figures are thus available in respect of seven, six, five, four and three year cases. These more detailed tables have already been circulated, and in concluding I desire to express my thanks to the staffs of the hospitals concerned which, by careful keeping of records, by maintaining touch with patients year after year to ascertain the end results of treatment, and by carefully compiling their figures and forwarding them to the Commonwealth Department of Health, have made possible the statistical review which I have had the privilege of presenting to this Conference.

THE TREATMENT OF CARCINOMA OF THE TONGUE.[1]

By HENRY SEARBY, M.S. (Melbourne), F.R.C.S. (England), F.R.A.C.S.,
Surgeon to In-Patients, Royal Melbourne Hospital.

FOR this conference I had prepared a paper, but a senior colleague, whom I asked to read it, pointed out to me that I was to some extent comparing the failures of radiotherapy with the successes of surgery. I have rewritten my paper because it was not, and is not, my intention to discuss the rival claims of radium and surgery in the treatment of this disease, but to point out the difficulties which confront the surgeon. These difficulties have long been recognized by surgeons, but need reconsideration in the light of certain aspects of the effects of radium. I think that I may say that while there is no real conflict in the minds of Melbourne surgeons about the rival claims of the two forms of treatment, there is a certain amount of what, for want of a better term, I must call dissatisfaction.

Cancer of the tongue is a fearsome disease. No amount of trouble is too much to take if we can save from its ravages a man with the prospect of many years of life before him. But in some instances energetic treatment directed towards a cure which is by no means certain is too formidable for an elderly individual to face, and he can be helped very greatly by palliative treatment of the condition in the mouth. This introduces at once the problem of the classification of cases. The division into operable, border-line, inoperable and very advanced is not helpful. It is too much dependent upon the point of view of the radio-therapeutist and serves no useful purpose in an individual case. It may be worth while doing but little in an operable case; it may be worth while carrying out very extensive surgical measures supplemented by heavy radiation in an inoperable case. The use of the term "apparent cure" when less than five years has elapsed since the last treatment is to be deprecated. Apart altogether from cure, we can sometimes regard as highly satisfactory a result which involves death from metastases within two years, if we pay due regard to a particular set of circumstances. And there are numerous examples of such palliative effects of radium. But they are not cures, nor even apparent cures. Thirty years ago surgeons commenced to use radium in the hope that it might be able to help in the treatment of patients in whom the complete excision of the primary growth and the lymphatic field was not possible. Had the results of excision been as uniformly successful as those obtained by excision of sebaceous cysts, radium would never have been introduced.

It is a fair assumption that the ideal treatment of any malignant condition is the complete excision of the primary growth and the lymphatic field before the occurrence of metastases, and the excision of the

[1] Read at the Seventh Australian Cancer Conference, Melbourne, May, 1936.

metastases if they have occurred. Those of us who are at clinical schools must teach students these principles. But we teach that the ideal is often unattainable; we teach that the prognosis depends, apart from operative mortality, on the occurrence later of irremovable secondary deposits. There has never been any subterfuge—if the prognosis is bad, we teach that it is bad, and text-books tell the same story. Herein I think lies some of the dissatisfaction I have referred to.

For more than five years now practically all patients with carcinoma of the tongue, lip and skin applying for treatment at the Royal Melbourne Hospital have been under the charge of the Radium Department. This conference is not the place to inquire why this has been done, nor indeed to air our domestic grievances. But such a state of affairs exists, to my knowledge, elsewhere in Melbourne than at our hospital and has not come about with the approval of the teaching staff. The student is deprived of this clinical material, the surgeon is not consulted, and many recent graduates are of the opinion that surgery is not of any help in the treatment of these malignant conditions. We have heard so often about the combination of surgery and radium, yet very few patients at the Royal Melbourne Hospital get the benefit even of the opinion of a surgeon once they reach the Radium Department.

I am not arguing about the relative merits of either form of treatment. I am making a plea for the utilization of the best that is in both. We have never been given an accurate statement of results, nor have we been told why so few patients are submitted to any form of surgical excision of the tissues in the neck. This information would be helpful to surgeons. On the other hand, we resent having to explain to students or resident medical officers who have wandered into the Radium Department why it is not criminal to operate on cancers of the lip and breast. So that perhaps we have some justification for our dissatisfaction.

If there are any present today who are not members of the medical profession, they should realize, as do our members, that no discovery and no statistical evidence have been brought forward in the past thirty years to alter the principles of treatment of epithelioma of the lip, tongue or breast. In the present state of our knowledge of the origin and mechanism of spread of cancer I am willing to be convinced that some of our ideas of pathology are wrong, but there can be no denial of the fact that cancer of the tongue is not a local condition.

Butlin's work on carcinoma of the tongue, which must be regarded as classical, may be divided into two periods. Between 1881 and 1895 he did not remove the lymphatic-bearing tissue and the lymph glands from the neck as a routine. From 1895 to 1909 he did, because he had been able to demonstrate, firstly that the percentage of cures was very much higher when this tissue was removed than when only excision of the growth was done, and secondly that the percentage of recurrences in the neck was much lower if the tissues in the neck were excised before the glands became enlarged by malignant change. These conclusions are still shared by all surgeons of experience and have been elaborated and extended, especially by Trotter and Handley.

In 1914 Trotter[1] stated in regard to early growths of the tongue:

> It is most important to recognize that the fact that a given tumour is in the superficial period of its growth has no bearing whatever on the question whether glandular infection has occurred or not. It should be accepted as an incontestable principle in the surgery of epithelioma that as soon as the diagnosis of the primary tumour can be made the presence of glandular infection must be assumed.

The fact that undoubted epitheliomata have been cured by local surgical removal does not alter that principle. I shall show later that a number of patients whose condition was regarded as carcinoma (but unfortunately not verified by section) have had the local lesion in the tongue cleared up, temporarily at least, and in one instance for five years, by the application of radium to the primary growth without any treatment whatever to the glandular area. Even if these were instances of carcinoma, the principle is not affected, for I shall show that in many more cases the glands rapidly became carcinomatous and did not respond to subsequent radiation.

I labour this aspect because I have been told repeatedly by men who are using radium that as so many patients never get glandular metastases, a prophylactic dissection of the neck is unnecessary. But they add that even if the glands do become infected, they can be irradiated. They certainly can be irradiated, but they will not be cured. In any event, to be consistent, a prophylactic dose of radiation should not be given if there is no need for prophylactic dissection.

We must admit quite frankly that it is impossible to predict the few cases of carcinoma of the tongue in which glandular metastases will fail to appear. In 1909 Butlin[2] stated that "the future of operative surgery of carcinoma of the tongue undoubtedly lies in the early diagnosis of the disease and in the routine removal of the glands before they are obviously enlarged". He had then operated upon 197 patients.

Dr. B. L. Butcher has kindly transcribed for me the records of all cases of carcinoma of the tongue treated in the Radium Department of the Royal Melbourne Hospital from 1928 until the end of 1935. I have excluded all cases in which the radiotherapeutist considered the disease too advanced for treatment and all cases in which any other form of treatment had been given before the patients reached the Radium Department, unless the patients are still living. I draw attention to the following facts:

1. One-third, at least, of all patients had no clinical enlargement of glands when they presented for treatment.

2. Of the twenty-two patients still alive (but not necessarily well), eight received no treatment of any sort to the glands (the diagnosis of most of these is open to doubt). Six had the glands excised surgically after they had become enlarged following the application of radium to the tongue; all are free from recurrence in the neck. Eight received radiation treatment to the neck; all are still suffering from enlarged glands; six of them are rapidly approaching death.

3. In one instance only was radiation therapy used prior to excision of the glands.

4. When excision of the glands was practised, the routine adopted when the glands were not palpable at the commencement of treatment was to apply radium to the tongue, and when the glands later enlarged to excise them.

5. Excluding the five operative deaths from insertion of needles in the 26 cases treated before glandular enlargement was detectable, no fewer than 14 of the 21 patients developed glandular metastases, and the diagnosis in the remaining seven cases was doubtful. (See Table XII.) Of these fourteen patients, seven are already dead despite radiation treatment, four more treated by radiation still have enlarged glands, and the other three are still alive and well after surgical excision of the glands. That is, the only patients who are well are those treated by excision of the glands or for whom no treatment of any sort was necessary.

It is, of course, impossible to infer what the results would have been had more patients been subjected to surgical excision of the glands, but it will help to remove some of our causes of worry if we can be told why more of these operations were not done. Trotter[1] has written:

> My own experience is that, provided the glands show clinical characters similar to those of the superficial type of growth, that is to say, are hard and well defined and free from any trace of inflammatory manifestations, their presence if a thorough operation be done can scarcely be regarded as making the prognosis worse than if none can be felt.

But it is obvious that it is not possible to demonstrate that radiation therapy has in any instance cured glandular metastases even temporarily. In reply to the contention that radiation treatment of the primary growth, unlike surgical excision, prevents glandular spread, the figures show that in the cases in which it was deemed advisable to treat the tongue with radium despite any glandular enlargement that existed, 78% of the patients who survived operation died within a year from glandular metastases. The figures also show that 63% of all patients surviving the operation of the insertion of needles into the tongue died from glandular metastases within a year despite radiation of the neck.

Summed up, radiation therapy at the Royal Melbourne Hospital in the seven years ended 1935 has in cases of carcinoma of the tongue (*a*) not cured glandular metastases in any instance, (*b*) failed to cure glandular metastases in 57 cases. Forty-one of these 57 patients are dead, eight have been cured of the glandular condition by excision, and the remaining eight still have enlarged glands.

This experience is not peculiar to Melbourne. Mekie[3] reported that Forsell, of Stockholm, had failed to obtain a radiological cure in any of 72 cases of carcinoma of the tongue in which glandular enlargement was present, and that Quick, of New York, had noted six cures (for periods not stated) by radiation treatment of glandular metastases following carcinoma of the tongue in 161 cases. In 1929 I could find no record of any patient at the Melbourne Hospital who had survived for three years after treatment with deep X ray therapy for malignant glands anywhere in the body.

I therefore maintain that the incontestable principle of Trotter is borne out and that there is no evidence that radiation therapy has succeeded in curing glandular metastases following carcinoma of the tongue. I do not suggest that all patients except those with large fixed masses of glands should be subjected to an operation on the neck. A competent surgeon would refuse to operate on many of them, but he should be given the opportunity to refuse. In the past surgical treatment has had its definite proportion of successes in regard to the prevention and cure of glandular metastases, and at present it seems to offer the only hope of prevention or cure.

For the primary lesion the principles of treatment are the same as for carcinoma of the lip and breast, that is, the removal of the tumour together with an area of normal tissue all round it.

Excision is possible according to these principles when the growth is small and is confined to the anterior third of a mobile tongue; the resulting disability is slight and the results are good. With infiltrating growths further back on the tongue this ideal of treatment can be obtained often only by an extensive operation resulting in considerable disability and followed by results which are not so good.

Without excision of the pillars of the fauces and parts of the pharyngeal wall the ideal may be impossible of achievement. It was in these cases that radium was expected to be of so much help if it could destroy the growth without causing gross disability. It will be seen in Table XI that only two patients (apart from operative deaths) are recorded as dying from the primary lesion. The tongue had not always healed in other cases at the time of death, but it was usually recorded as "improved", although in many instances repeated applications of radium were required and in others a partial excision of the tongue was performed because of failure to heal. So that, although we can produce only two proved cases of carcinoma in which the patients have survived for more than five years, radium does seem to be giving the help we hoped for in the treatment of the primary growths which are inaccessible to the surgeon.

In Tables I to XI I have set out the results in general obtained at the Radium Department of the Royal Melbourne Hospital. The following points are of interest:

1. Thirteen patients died as a result of having radium needles inserted into the tongue. This is an operative mortality of 16%, which is very high for what is reputed a simple procedure. I count as operative deaths those which occur within a few days of the operation; this, however, does not appear to be the custom in the Radium Department, for in Table XVI I show the entries for these deaths. (Butlin had an operative mortality of 20 in 197 cases, that is, 10%.)

2. Fifty *per centum* of patients died within a year of commencing treatment. (I have excluded all cases which the radio-therapeutist considered too far advanced for treatment.)

3. Only three patients have survived for more than five years. One of these was never proved to be suffering from carcinoma and there is every reason to believe that the condition was syphilitic; for one of the other patients a radium pack was used on the neck prior to excision of the glands, and the remaining patient has had the glands excised.

There are four observations I wish to make about radiation therapy:

1. All surgeons who have to deal with malignant disease must at some time or other have committed errors of judgement that have involved them in an operation in which, having planned to excise tissue beyond the limits of a growth, they have actually found themselves cutting through outlying portions of the growth. In some way, which I do not think is thoroughly understood, this is liable to result in an almost explosive spread to glands or in a very rapid recurrence. I have been told by radio-therapeutists that whereas this frequently happens

TABLE I.

Type of Case in Regard to Glandular Enlargement

26 patients (33%) presented without glandular enlargement.
8 patients (10%) presented with "doubtful" enlargement of glands.
44 patients (57%) presented with glandular enlargement of varying degree.

TABLE II.

Of 78 patients
13 (16%) were dead within a few days from the operation of inserting radium needles.
27 (34%) were dead within six months
39 (50%) were dead within one year.
(Butlin's operative mortality was 20 in 197, that is 10%.)

TABLE IV.

Of 78 patients
1 has had no radium.
77 have had radium treatment to the tongue.
73 of these have had only radium treatment to the tongue.
4 have had an excision of the tongue in addition.

Of the 73 who had only radium to the tongue
55 are dead.
13 at operation of inserting needles.
2 from the spread of the primary growth.
40 from glandular metastases.

Of the 4 who had excision of the tongue after radium application
1 died from glandular metastases

Of the whole 78 patients
56 are dead.
22 are still alive.

TABLE V.

26 patients presented for treatment without glandular enlargement.
5 (19%) died from the operation of inserting needles.
5 (19%) died from glandular metastases despite radiation therapy after periods of five, seven, eight, eighteen and twenty-one months respectively. The average time of life was just under twelve months.
5 (19%) had excision of the glandular metastases which followed the application of radium to the tongue.
3 are still alive, without any recurrence of the glandular metastases after five, four and four years.
2 died, without glandular recurrence, from sudden recurrence of primary growth, forty-nine and thirty-four months respectively after glandular excision.
4 (15%) developed glandular metastases after application of radium to the tongue, but were treated by radiation instead of by excision of the glandular metastases. All 4 have steadily enlarging glands.
7 (28%) have had no treatment whatsoever to the glandular area and are still alive and well six, four, four, three, three, two and one year respectively after application of radium to the tongue. These cases are set out in detail in Table XIV.

TABLE VI.

26 patients presented without glandular enlargement.
5 died from the operation of inserting needles.
14 developed metastases.
5 died within an average period of one year, despite radiation.
2 died after excision of glands from recurrence of primary growth, but without recurrence of glandular metastases.
7 did not develop glandular metastases, and have had no form of treatment to the glandular area.

Therefore, excluding the 5 operative deaths,
14 patients out of 21 who did not have any enlargement of glands at the commencement of treatment developed glandular metastases.
7 of these are dead.
4 have steadily enlarging glands.
3 are alive and well after surgical removal of the glandular metastases.

So that radiation therapy has not been responsible for freedom from glandular metastases in any of these cases.
10 patients of the 26 are alive and well.
7 without any form of treatment to the glands.
3 after surgical excision of the glands.

TABLE VII.

8 patients presented with glands "doubtfully enlarged".
All are dead, from glandular metastases, after periods of sixteen, five, eleven, nine, six, twelve, ten and eleven months respectively.
Average: nine months.

TABLE III.

Percentage Mortality Figures over the Years, set out for Cases Treated in each Year.

Year.	Percentage Operative Mortality.	Percentages Dead within—						
		Six Months.	One Year.	Two Years.	Three Years.	Four Years.	Five Years.	Six Years.
1928	20	40	60	80	100	100	100	*100*
1929	10	40	70	70	70	90	90	*90*
1930	10	40	40	90	90	90	*90*	
1931	23	30	38	54	61	*61*		
1932	7	13	33	53	*53*			
1933	22	44	55	*66*				
1934	0	12	*50*					

TABLE VIII.

44 patients out of a total of 78 presented for treatment with glands which were "palpable", that is 56% of the patients.
- 8 (18%) died from the operation of inserting needles.
- 28 (64%) died at varying periods of from one to thirty-two months from the glandular metastases. The average period of life was less than one year.
  - Neck treated with radium—average period nine months.
  - Neck treated with X rays—average period eight months.
  - Neck treated with both—average period twenty-five months
- 8 (18%) are still alive.
  - 1 glands disappeared without any treatment.
  - 3 glands excised without recurrence so far for five years (radium pack first), four years, and two years.
  - 4 treated with radiation still have enlarged glands.

So that 4 out of 44 are still alive and well for from two to five years.
- 3 of these have had the glands excised
- 1 had no treatment to glands, but they disappeared.

Radiation therapy, therefore, has not been responsible for curing glandular metastases in any instance.

TABLE IX.

78 patients.

56 (dead):
- 13 (16%) died from operation of inserting needles.
- 41 (53%) died from glandular metastases after radiation treatment, in average time of less than one year.
- 2 (2%) died from recurrence of primary growth after excision of glands without recurrence forty-nine and thirty-four months, respectively, previously.

22 (alive):
- 14 (18%) alive and well.
  - 6 following excision of glands. Radium was used prior to one excision (five-year case). The others are five, four, four, four and two years respectively.
  - 8 are still alive and well without any form of treatment to the glands.
- 8 (11%) alive, but all have enlarged glands after radiation treatment to the neck.

Therefore radiation therapy has:
(1) Cured glandular metastases in no instance.
(2) Failed to control glandular metastases in the 49 cases in which it was used for this purpose. Forty-one of these patients are dead, and the remaining eight still have enlarged glands

Surgical excision of enlarged glands has been done in 8 cases.
- 6 patients are still alive and well after five, five, four, four, four and two years.
- 2 patients are dead. They lived for forty-nine and thirty-four months respectively, without recurrence in the neck, and died from recurrence of the primary lesion.

TABLE X.

22 living patients.
- 8 no glands at the beginning of treatment (including one case in which glands disappeared without treatment).
  - No glandular metastases have developed.
  - No treatment of any sort has been given to the glandular area.
  - Periods: six years, 1 case, four years, 3 cases, three years, 2 cases, two years, 1 case, one year, 1 case.
  - In 7 of these cases the diagnosis is open to doubt. (See Table XII.)
- 6 glands were excised after they had enlarged following the application of radium to the tongue.
  - 5 had no glandular enlargement at the beginning of treatment. The glands enlarged after radium treatment of the tongue. They were then excised. The patients are alive and well after five, four, four, four, two years.
  - 1 had glandular enlargement at the beginning of treatment. The glands were treated with a radium pack after the tongue had been treated with radium. The glands were then excised. Patient is still alive and well after five years.
- 8 glands were treated with radiation.
  - 5 of these had no glandular enlargement at the beginning of treatment. The glands enlarged after application of radium to the tongue.
  - 3 of these presented with glandular enlargement. The tongue was treated with radium and the neck has been treated with radiation.
  - All 8 still have enlarged glands.

TABLE XI.

56 dead patients.
- 12 presented for treatment without any glandular enlargement.
  - 5 died from operation of inserting needles into tongue.
  - 5 died from glandular metastases (average period less than one year) despite radiation treatment to the neck.
  - 2 died from recurrence of primary growth after having had the glandular metastases excised forty-nine and thirty-four months previously, respectively.
- 8 presented with doubtful enlargement of the glands.
  - 8 died from glandular metastases in an average period of less than a year, despite radiation treatment to the neck.
- 36 presented with enlargement of the glands of varying degree, but all were considered suitable for treatment.
  - 8 died from the operation of inserting needles into tongue.
  - 28 died from glandular metastases within an average period of less than a year, despite radiation treatment to the neck.

That is, 56 deaths.
- 13 from operation of inserting needles into tongue.
- 41 from glandular metastases.
- 2 from recurrence of primary growth after radium to tongue.

when surgical excision is attempted, it cannot happen when radium is buried, because radium closes the lymphatics. Now radio-therapeutists are no more immune from errors of clinical judgement than are surgeons. They can quite conceivably put the needles in the wrong place through lack of recognition of certain clinical signs, just as surgeons can place incisions in the wrong place. The fibrosing effects of radium take time to develop and the needles in the meantime have in a minor degree the effect of a scalpel. Certain it is that at the Radium Department of the Royal Melbourne Hospital during the past seven years the glands in the neck enlarged in the vast majority of instances in which radium was buried in the tongue. Without entering into the realm of physics, I feel that as the effect of radium emanations decreases in conformance with definite laws according to distance, there must be some regions

TABLE XII.

Diagnosis Open to Doubt.

Example Number.	Observation.
1	Certainly wrong. Case included for the sake of completeness. A basal celled carcinoma was removed from the tongue. No radium has been used. (Three years.)
2	Small soft papule without infiltration on the anterior third of the tongue present for a few days. No section. (Four year case.)
3	Small blue pimple four millimetres in diameter on the anterior third of the tongue. No induration present. No section. (Three year case.)
4	Thickening on right border of the tongue. Noted as "probably an early epithelioma". No section. (Two year case.)
5	Small papule four millimetres in diameter on the middle of the anterior third of the tongue. It was quite soft, and there was no trace of induration. No section. (One year case.)
6	Small ulcer on the right side of the anterior border upon which repeated applications of radium had but little effect, so it was excised. No section. (One year case.)
7	Recurrent ulcer at the edge of a diathermized area two years after diathermy. No glands had developed during this three years, although no treatment of any sort had been given to the neck. Radium was applied in 1929, 1930 and 1932, without cure. The tongue was again excised in the radium department with a diathermy knife in 1932, and another application of radium given. Wassermann reaction +++. Anti-specific treatment has been given practically continuously for six years. (Six years case.)

TABLE XIII.

Observations on the Classification of Severity of Cases Treated.

Example Number.	Observations.
1	An ulceration of the tongue of two years' duration after diathermy excision of a portion of the tongue. No glands had appeared. Classified as "inoperable". (As the tongue did not heal with repeated applications of radium, it was again excised.)
2	A recurrent ulceration two years after diathermy of what the doctor who performed the excision termed an "indolent sore". No glands had appeared during that period of two years. The recurrent "growth" or "ulceration" consisted of "a lump the size of a pea in the middle third of the right side of the tongue". There was no induration. Classified as "inoperable". ("Radio-necrotic ulceration" persisted for three years. By then the glands were enlarged, and have remained so.)
3	Ulcer on the right side of the frenum. No induration. No glandular enlargement. Classified as "borderline".
4	Ulcer for six weeks on the right side of the anterior border of the tongue. No glandular enlargement. Classified as "borderline".
5	Generalized induration of the tongue. Wassermann reaction "+++". Scar at the tip had been excised, and reported to be a carcinoma. Radium was applied to the scar. Eleven months later the tongue was excised because healing had not occurred after application of radium. Classed as "inoperable".

NOTE.—No sections were taken from examples 1, 2, 3, 4.

distant from the growth where the dosage is irritant rather than destructive. In this way unrecognized malignant tissue, perhaps in microscopic amounts, can be stimulated by the radium emanations in just the same way that it would be irritated by inadequate incision. In reading over the records I have been impressed by the frequency with which late ulceration is liable to occur beyond the margins of the destroyed growth. This is sometimes referred to in the records on purely clinical grounds, without any microscopic examination, as "recurrence", sometimes as "superficial ulceration", and sometimes as "radio-necrotic ulceration".

2. I have been called upon in my private practice to excise malignant glands in the neck following radium treatment of epithelioma of the lip and tongue up to eight years after such treatment. This late appearance of secondary glands has been noted in the literature and makes it all the more necessary after radium treatment to insist upon a period even longer than after surgical treatment before the term "cure" is applied.

3. In 1907 "cures" of epithelioma of the tongue were recorded. In the intervening twenty-nine years there has been a continual alteration of the method of application of radium. Enough time has elapsed for satisfactory figures to be published embracing cases treated over a period of fifteen years, but I

TABLE XIV.

Summary of Histories of those Eight Living Patients in whom, despite the lack of any Treatment to the Glandular Area, no Glandular Metastases have Developed.

Number of Case.	Length of Case in Years.	Classification.	History.
1	6	"Inoperable."	A recurrence two years after diathermy of a small "lump". No glands had appeared. Wassermann "+++". Radium buried in 1929, 1930 and 1932. Healing did not occur. Further excision of tongue in radium department in 1932. Radium implanted again. No section taken. No glands appeared. No treatment given to the neck. Anti-specific treatment almost continuously for six years.
2	4	"Very advanced."	Ulceration of the posterior third of the left lateral border of the tongue, extending on to the tonsil and soft palate. "One small gland palpable in the submaxillary region." No section taken. One application of radium to the tongue. Rarefaction of mandible with fracture occurred later. Gland disappeared without any treatment.
3	4	"Operable."	Small soft papule with a scab on the middle of the anterior third of the tongue; no infiltration. Has been present for a few days. No glands palpable. No section taken. No treatment to the neck. One application of radium to the tongue.
4	4	"Borderline."	Ulcer one centimetre in diameter present for three weeks at junction of anterior pillar and right border of tongue. No glands palpable. One application of radium. No section taken. No treatment to neck. Necrosis of mandible followed, with fixation of jaw now.
5	3	"Operable."	Small blue pimple four millimetres in diameter on anterior third of dorsum. No infiltration. No glands palpable. No section. One application of radium. No treatment to neck.
6	3	"Operable."	Basal-celled carcinoma excised by author. It constituted a small recurrent lump on the under surface of the tongue, and had been excised elsewhere three years previously. It was not excised widely because its nature was not suspected. When the section was seen the patient was sent to radium department for possible irradiation of the region of the scar because of the limited nature of the operation. No treatment has been given, however, and the patient is still alive and well. (Included because it appears in records.)
7	2	"Operable."	Thickening of the posterior border of the right side for eight weeks. No ulceration, no induration. Described in records as "probably early epithelioma". No section. No glands palpable. One application of radium. No treatment to neck.
8	1	"Operable."	Nodule four millimetres in diameter on middle of anterior third of dorsum. No induration, no ulceration. No section. One application of radium (followed by abscess in the tongue). No treatment to the neck.

TABLE XIVA.

Summary of Six Living Patients on whom Excision of Glands was Performed.

Number of Cases.	Length of Cases in Years.	Classification.	History.
1	5	"Inoperable."	Ulcer on lateral edge of posterior third. "Two or three glands palpable at angle of mandible." Needles buried in tongue. Glands increased in size. Radium pack applied to neck. Glands excised. Recurrence in tongue five years later treated by further application of radium.
2	4	"Inoperable."	Generalized induration of tongue. Wassermann "+++." Scar at tip excised; section showed epithelioma. Radium applied to this area. No glands palpable. Did not heal. After eleven months part of tongue excised. Glands became enlarged, and were excised ten months after this.
3	4	"Operable."	Small lump under tongue. Right submaxillary gland enlarged. Radium applied to tongue. No section. Gland became bigger. Glandular area then excised.
4	3	"Borderline."	Ulcer on right side of frenum. No glands palpable. Radium applied to ulcer. Glands became enlarged. They were excised.
5	2	"Inoperable."	Records state "epithelioma in middle third left side of a generalized leucoplakic tongue". No glands palpable. One application of radium. Glands became enlarged. They were then excised.
6	2	"Operable."	Nodule three millimetres in diameter on dorsum of tongue. No glands palpable. Radium applied to tongue. Glands then became enlarged. They were then excised.

have been unable to find any such statistics. The continual change in method implies that results are not altogether satisfactory.

4. As a surgeon I cannot believe that it is possible for radium needles to be inserted accurately in the neck along the great vessels without those vessels being exposed by operation.

There has been so much talk of the combination of radiation and surgery that the expression has become almost a *cliché*. Any combination will not help unless the correct principles are followed, and we seem to be in danger of forgetting these principles. Many cases of carcinoma of the tongue are hopeless when first seen either by a surgeon or by a radio-therapeutist. Hopeless for the surgeon because he cannot excise fixed glands, hopeless for the radio-therapeutist because radiation will not cure the glands. Surgeons have admitted this for forty years. It is certainly reasonable and very helpful to the patient to palliate the condition by treating the primary lesion with radium in many instances. But if a radio-therapeutist thinks it advisable to irradiate the primary growth in the presence of fixed glandular metastases, the fact that only palliation is aimed at should be made clear to the medical students and to members of the profession. If a radio-therapeutist thinks it advisable to irradiate the tongue when no glandular enlargement is present, he should tell these same people that glandular enlargement will almost certainly follow and that radiation is ineffective against it. It is distressing to find that students at their final examinations do not know the principles of treatment of carcinoma of the tongue and that their knowledge is summed up in the word "radium". Remonstrance elicits the fact that, as they have never seen the neck in such cases operated upon

TABLE XV.

Comparison of Butlin's figures over the years 1851 to 1909 in regard to treatment of glandular metastases and the figures of the Radium Department at the Royal Melbourne Hospital over the years 1928 to 1935.

Butlin.	Radium Department, Royal Melbourne Hospital.
34 patients with enlarged glands prior to operation had an excision of the glandular mass (excluding operative deaths). 7 of these died of recurrence of the glandular metastases.	36 patients (excluding operative deaths) presented with enlarged glands. Treated by radiation to glands in 35 of the 36 cases. 28 already dead. 4 still have enlarged glands. 1 glands disappeared without treatment. 3 glands excised. Still well.
22 patients who presented without glandular enlargement survived operation of prophylactic excision of glandular area. 1 died of recurrence of glandular metastases.	21 patients presented for treatment and survived operation on tongue (insertion of needles) where no glandular enlargement was present In 14 glandular enlargement followed. 9 were treated radiologically. 5 are dead. 4 have enlarge glands. 5 were treated surgically. 3 still well. 2 died from recurrence of primary, but did not get recurrence of glandular metastases after forty-nine and thirty-four months respectively.

TABLE XVI.

Operative Deaths.

Operation: Insertion of needles in tongue.

Cause of Death.	Classification in Records.
Cardiac failure.	"Local improvement. Died intercurrent disease" (six days after radium treatment).
Bronchopneumonia.	"Not classified."
Bronchopneumonia.	"Not improved. Died."
Bronchopneumonia.	"Not classified."
Hæmorrhage.	"Not classified."
Bronchopneumonia.	"Not classified."
Sepsis in neck.	"Not classified."
Carcinoma of tongue.	"Died malignant disease."
Pneumonia.	"Died other causes."
Carcinoma of tongue.	"Not improved. Died."
Pneumonia.	"Not improved. Died."
Carcinoma of tongue.	"Died malignant disease."
Bronchopneumonia.	"Not classified."

by their surgical teachers, and as they have never seen a case of the disease in the surgical outpatients' clinics, they believe that surgery has no place in the treatment.

I believe that radium, properly utilized, can, without any surgical aid, cure rodent ulcer; but so can surgical excision. The probability that radium can remove permanently the primary growth in other carcinomata does not mean that it can cure the disease, because glandular metastases will kill. The limitations of the curative properties of radium should be made clear, because radium is so helpful in combating cancer that we cannot afford to do without it at present. But if it is used where there is no reasonable chance of cure, it will inevitably be discredited in the minds of the public and of the medical profession. In the treatment of glandular metastases following carcinoma of the tongue there is not this reasonable chance of cure.

The facts about carcinoma of the tongue are:

1. Glandular metastases are the cause of death in the overwhelming proportion of cases at the present time.

2. There is no evidence that radiation therapy can prevent or cure these glandular metastases.

3. There is abundant evidence that surgical excision, properly performed, can in a definite proportion of cases (*a*) prevent the occurrence of glandular metastases, (*b*) cure glandular metastases according to their extent and fixity.

4. Surgical excision can cure primary lesions in the tongue when the principles of cancer surgery can be followed; but if the anatomical situation is such that these principles cannot be carried out, and to avoid mutilation even if they can, we must rely upon the selective destructive effects of radium for a cure of the primary growth.

5. It seems that in appropriate dosage radium is capable of producing a remarkable disappearance of outward signs of carcinoma of the tongue in situations where surgical excision cannot be contemplated.

We must utilize this knowledge and every patient becomes an individual problem. There can be no fixed rule about treatment. The relatively greater degree of malignancy of growths on the posterior half of the tongue will make us hesitate to resort to heroic measures in the hope of a cure. The patient's prospects of life, apart from the malignancy of the tongue, will make us be content with a palliation of the primary lesion sometimes, but will make us resort to very energetic treatment, including excision and radiation of the tongue, so as to leave fewer cells for the radium to deal with, and excision and radiation of the tissues of the neck; we may even resort to temporary tracheotomy and gastrostomy in order to try to effect a cure. I would plead for a removal of all teeth prior to any form of treatment in the mouth, radiological or surgical, and feel that we can rely on Trotter's statement that a month spent in the toilet of the mouth will not turn a curable into an incurable case. It will, on the other hand, avoid most of the troubles of infection, which are very real with radium implantation as well as with surgical excision.

Lastly, at the risk of criticism, I would add that it matters very much who does the surgical part of the treatment. In no part of surgery is an adequate knowledge of anatomical, pathological and surgical principles so essential as it is in the surgery of malignant disease. In Melbourne we must try to combine first class surgical technique with radiation therapy, for it is inexpedient for surgeons to become users of radium. I have endeavoured to convince you that the biggest obstacle to the cure of carcinoma of the tongue at the present time is the glandular spread, against which radium is ineffective and for which surgical treatment holds out the only hope of prevention and cure, even though it is not applicable in every case. I trust that I have had at least some measure of success, and in conclusion commend to you one of the "Meditations" of Marcus Aurelius:

> If any man can convince me and bring home to me that I do not think or act aright, gladly will I change; for I search after truth, by which man never yet was harmed. But he is harmed who abideth on still in his deception and ignorance.

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CARCINOMA OF THE TONGUE.

By IVAN B. JOSE, M.S. (Adelaide), F.R.C.S.,
Honorary Surgeon, the Adelaide Hospital; Director of Surgical Studies, the University of Adelaide.

THIS paper is a *résumé* of cases of carcinoma of the tongue treated at the Adelaide Hospital Radium Clinic, including an account of the technique of treatment used and the results obtained, together with a few observations deduced from them.

The series comprises 62 cases treated from 1929 to June, 1933. The plan of treatment used was: (i) Interstitial radiation with unit strength 0·5 millimetre platinum-covered radium needles distributed in and well round the palpable growth as evenly as possible in order to radiate the whole body of the tongue. This ideal could not always be attained when the growth extended far back into the posterior third of the tongue. (ii) Surgical removal of the glands, (*a*) by a Crile dissection of the neck (in seven cases), (*b*) by a less complete removal of glands (in eighteen cases), in each instance followed by radiation; or else treatment by radiation only with a radium mould or deep X ray therapy (in thirty-five cases), when surgery was contraindicated by the general condition of the patient or the local condition in the glands.

The cases are grouped according to their situation in the tongue in the four main sites: (i) The anterior two-thirds of the body of the tongue; (ii) arising at

[1] Read at the Seventh Australian Cancer Conference, Melbourne, May, 1936.

or near the junction of the anterior pillar of the fauces with the tongue; (iii) arising in the vallecula on the posterior portion of the tongue; and (iv) arising from the floor of the mouth. It would appear that this division is as useful in grouping the problems of radiological technique in treatment as it was in helping to solve the problem of surgical approach when this was the only treatment.

Only those patients who are at present alive and have been alive for at least three up to six years since their treatment are regarded as potentially cured. There were ten survivals, as follows: three out of fourteen patients with carcinoma of the body of the tongue; four out of nine with carcinoma of the anterior pillar of the fauces; none out of five with carcinoma of the vallecula; and three out of twenty-five with carcinoma of the floor of the mouth. The total percentage rate for three-year cures is therefore 16%, or if the floor of the mouth is excluded, which appears to be done in most statistics in articles on carcinoma of the tongue, the survival rate is seven out of thirty-five cases, or 20%. This alone is not a particularly satisfactory result; but when the patients who have been cured for three or more years are analysed more closely, the fact is brought out that only in the comparatively early cases in which the carcinoma is of limited extent and of the proliferative rather than of the ulcerative type, and in which the primary lesion is clinically contained within the tongue, have cures been effected. No patient who at operation had carcinomatous deposits in the lymph glands in the neck survived the three year period and, incidentally, only two of the patients who survived were subjected to a Crile dissection of the neck; four had a more limited excision of glands. Four had no surgical treatment of their glands at all for some reason or other. I mention this not to decry complete surgical removal of the glands of the neck, at least on the affected site in all cases of carcinoma of the tongue in which it is feasible (other experience has proved the necessity for this), but to show that some of the survivors in this series were seen at an early stage, and that the malignancy found was so mild that the glandular area had not yet become too involved to be dealt with by radiation alone. In seven of the surviving patients the tumour was of the papillary type, and in only three of the ulcerative type. Except for the comparatively difficult site at the anterior faucial pillar requiring rather mutilating surgery for eradication of the tumour, all these patients could have been treated by surgery with every prospect of success. The freedom from mutilation of the tongue and mouth is, however, a definite point in favour of radiation treatment.

From the remainder of the group, the non-survivors, the following observations have been drawn.

The high mortality rate is largely accounted for by the advanced age of the patients who appear for treatment, the average age in this series being sixty-seven years; sixteen patients were in the eighth decade, and five in the ninth.

Also, the very advanced stage at which the majority of the carcinomata of the mouth are first seen is an important factor in maintaining the high mortality rate. It is to be hoped that public propaganda work will be successful in bringing cases of carcinoma of the mouth earlier for treatment in future generations.

We have found that no case has responded well to treatment when a recurrent growth has occurred in the scar made by a previous surgical removal, by previous extensive radiation or by syphilis; in several instances such patients have responded extremely badly.

It would appear that carcinoma arising on a superficial glossitis which principally occurs in the anterior dorsum of the tongue would be better treated by surgical excision.

In eight out of thirty-eight cases in which the Wassermann reaction was determined it was positive.

The five fatal cases arising in the vallecula call for comment. The situation is notorious for the difficulty it presents in treatment. The average age of patients in this group was seventy-three years. Three were treated by intensive deep X rays which caused considerable affection of their larynx with hoarseness; after temporary alleviation for some months, local recurrence took place. One patient was subjected to diathermy coagulation and a dissection of glands, but died of pneumonia following a second application of diathermy for a local recurrence. One patient died of pneumonia following the interstitial application of radium.

Five other patients with advanced lesions in the floor of the mouth were treated by deep X radiation alone without any benefit beyond some shrinkage in the size of the growth.

Treatment of Glands.

No patient with clinically evident deposits in glands has been cured by radium mould or deep X rays, although some masses have been decreased in size for a period. Following surgical excision of glands no patient in whom deposits were found in the excised glands has lived two years after operation. Of the twenty-five operations on cervical glands only seven have been block dissections of the neck; the remainder have been excisions of the submaxillary glands only, or of those with a few from the upper deep cervical chain.

A study of the pathology of the lymphatic spread from cancer of the tongue would definitely indicate the advisability of more extensive removal when the age and general condition of the patient allowed.[1]

SOME OBSERVATIONS IN RADIUM TREATMENT OF CANCER OF THE TONGUE.[2]

By VAL MCDOWALL,
Brisbane.

Predisposing Causes of Cancer of the Tongue.

FIRST in importance of the predisposing causes of cancer of the tongue is age. In our own series nearly 40% have occurred in patients between the

[1] As a result of the experience in this series of cases, the present practice at the Adelaide Hospital Radio-Therapy Clinic is that described in this journal in the issue of July 25, 1936, at page 137.

[2] Read at the Seventh Australian Cancer Conference, Melbourne, May, 1936.

ages of fifty and sixty-five years. Above and below these ages the frequency has rapidly fallen off, so that I think we may consider it a disease of the fifth and sixth decades of life.

That there is a predisposition in some cases to the development of cancer is shown by the three following patients, whom I have recently seen, suffering from cancer of the tongue.

One is a woman who had been previously treated by us for a scirrhous carcinoma of the breast, with a satisfactory result; she recently reported with a carcinoma of the tongue. Another is a man who was treated two years ago for carcinoma of the tongue, and he has now reported with a scirrhus of the breast and glandular involvement of the axilla. A third is a man who two and a half years ago had a squamous carcinoma of the skin near the right eyebrow, then later a squamous carcinoma (not a rodent) of the lip, followed by a carcinoma of the tip of the tongue. This patient has recently reported for treatment with a carcinoma of the posterior third of the tongue, accompanied by glandular involvement of the cervical region.

Second in order of importance appear to be insanitary conditions of the mouth. There is no need to stress this any further as it has been already mentioned by others; let me say, however, that rough areas in teeth and dentures should receive more attention than they do.

Thirdly comes syphilis. In about 30% of our cases this disease was present. In many of them valuable time had been lost in prolonged anti-syphilitic treatment. I believe in carrying out the anti-syphilitic treatment, but not in delaying the commencement of radium treatment.

Prognosis.

The presence of palpable glands at the time of commencing treatment is an extremely bad feature. Almost every patient with infected glands has subsequently died.

The position of the growth on the tongue appears to be important. Growths affecting the posterior third of the tongue almost invariably develop glandular metastases in spite of all treatment. Possibly one of the reasons for this is that the locality makes the accurate positioning of the needles more difficult. Another is that the early absence of pain leads to a longer delay before the patient seeks treatment.

Method of Treatment.

I have been treating cancer of the tongue since 1928 with interstitial application of radium.

In the early years of this period the filtration was with 0·5 millimetre of platinum; latterly we have been using heavier filtrations; otherwise our methods have not materially changed. The needles have a radium content of one milligramme per centimetre of active length, and may be of one, two or three centimetres of active length. They are inserted under local or general anæsthesia, according to the type of case, around and under the margin of the lesions, and are spaced 1·5 centimetres apart. In placing the needles it is necessary to remember that the growth extends considerably beyond the palpable margin, and it is the growing edge which should receive the most irradiation.

The average time for which the needles are left in place is seven days. One of the reasons for adhering to the seven-day period is because it is the most economical in beds. We always thread the needles with a double thread; one of these is a strong white linen thread, and the other is a thin black one. The black thread is used for stitching the radium needle into the tongue. It makes the process of stitching in a little more difficult than when a single thread alone is used, but it is very much easier to remove the needle afterwards, and there is less danger of cutting the wrong thread, which can easily happen when only a single thread is used, and there is therefore less danger of having to fish for a lost needle; the colour of the thread also makes it easier to find. If a needle became lost in the substance of the tongue, which occasionally happened when only one thread was used, I found it comparatively easy to recover by screening the patient on the X ray table and removing the needle by forceps directed under the fluoroscope. It is only a matter of a few seconds if the operator's eyes have been given sufficient time to be thoroughly accustomed to the darkness.

Emanation is used only occasionally, as it has to be imported from another State, and also because filtrations of 0·5 millimetre or more of platinum have been difficult to obtain in the past. More recently the filtration has been increased and improved. A further improvement would be the use of threads on the emanation "seeds", so that they could be removed at the end of treatment and not left to act as foreign bodies in the tissues. It is a pity that we have been unable to make more use of emanation, as the ease of application makes it ideal for growths of the tongue, especially of the posterior third. In consequence of the difficulty of obtaining emanation when required, our method of treating growths in the posterior third of the tongue has been to insert the radium needles through the skin of the floor of the mouth, the needles being directed by a palpating finger within the mouth. It is quite easy to arrange a suitable distribution of the needles, and the patients in whom this method is used usually complain much less of pain than those in whom the needles have been inserted through the dorsum of the tongue. The extraction of the needles is also much easier through the skin route.

When the growth extended over a large area and involved the floor of the mouth and lower jaw, interstitial application of radium was not found to be suitable, and we prefer externally radium applied on a Columbia paste mould two centimetres thick. When the anterior third of the tongue has been involved for only a comparatively short time, we consider that involvement of the cervical and sub-maxillary glands is not so liable to occur as in the patients in whom the posterior third of the tongue has been involved. In the former we do not recommend immediate dissection of glands, but use a radium Columbia paste mould to the neck in addition to the interstitial radium. On the other hand, when the posterior third of the tongue is

involved we always recommend surgical dissection of the neck, and follow it with a Columbia paste mould after the wound has healed. We do not advocate surgery prior to the commencement of radium treatment. The effect of the diminished blood supply which naturally follows surgery, makes radium results poorer than they would otherwise be, and there is also more liability of radium necrosis. The interstitial application of radium to the local growth prior to the surgical dissection does not interfere with or make the surgical procedure more difficult. Second local applications of interstitial radium are always risky, and tend to increase the danger of necrosis.

When satisfactory surgical removal of the glands cannot be carried out, it is our custom to advise the insertion of radium needles at the time of the operation, and the results are at times moderately good. When the glandular removal is complete the glands are examined microscopically, and if they are found to be infected a heavy treatment of radium on a Columbia paste mould is given to both sides of the neck. If they are not found to be infected, a lighter radium treatment is given.

Complications.

The most severe, although not a very common complication, is necrosis either of the soft tissues or of bone. During the last seven years in only two cases did any extensive necrosis of soft tissues occur. But in several, and they were the cases in which definite bony involvement was present, necrosis of bone occurred. Both types of necrosis were accompanied by increased pain, until the sequestrum or slough separated. We thought that by keeping the radium well away from the neighbourhood of the bone and by increasing filtration this complication might be avoided. However, bony necrosis still occasionally happens, and it seems to depend more on the extent of bony involvement than on the method of treatment. The use of heavier filtrations may reduce the risk of local soft tissue necrosis, but is not likely to affect bony necrosis to any great extent. The removal of a tooth some months after the use of radium has set up a late bone necrosis.

The use of diathermy in some cases to remove large fungating masses has been found to assist materially in shortening the period under treatment, and is accompanied by an immediate improvement in the comfort of the patient. In the two patients in whom soft tissue necrosis followed radiation, the use of diathermy has helped to remove the necrotic tissue and so to lessen the period of waiting for the slough to separate.

Interstitial application of radium to the tongue does not seem to increase the difficulty of the surgical dissection of the neck.

Of the various combinations of treatment, I prefer interstitial application of radium to the local growth, followed by surgical dissection of the cervical region, which again should be followed by a Columbia paste mould applied to the neck. High voltage X ray therapy is sometimes used in conjunction with radium. In several cases it has proved advantageous.

I am of the opinion that the low voltage, low filtration method, now so much advertised, but about which no figures over a period of seven years can yet be obtained, appears to be a retrograde movement rather than an advance in our methods of treatment. Sufficient time has not yet elapsed to enable us to learn either its full beneficial effects, or possibly what is more important, its harmful effects.

It seems to me that the success of any method of cancer treatment should be judged not by the rapidity of the disappearance of the local growth, but by the permanency of the result.

Results of Treatment.

The results of treatment depend on the class of case sent by the surgeon for radium. In order to gain some idea of our past results I have investigated the figures of the Brisbane General Hospital for the year 1929. The number, I must admit, is very small, for in that year only twenty-five cases of cancer of the tongue were treated. In many the floor of the mouth, as well as the tongue, was involved. No cases of leucoplakia are included in this series, although most of them have been treated successfully and they are rather numerous. I am using the 1929 figures because the patients now alive have survived for a period of six years approximately and I think can be considered as cured. Any cases of more recent origin have not withstood the test of time and are consequently of less value.

I have not included cases in which the heavier filtration methods have been employed, for the reason that these cases have been treated too recently for the results to be of much use. When the patients treated with the heavier filtration have survived the seven year period, it will be interesting to compare the results of the heavier and lighter filtration methods.

In all of my tongue cases, with a few exceptions, the diagnosis has been proved by sections which were microscopically examined and reported as carcinoma by the pathologist. In only a few of the very obvious cases was a section not carried out.

The cases have not been selected at all; the patients were nearly all hospital patients, and some attempt at alleviation by radium has been made in nearly every instance.

Although my figures are small, I find on comparing them with those of other workers who have larger numbers to deal with that there is not a great deal of difference in the average results. Of our patients treated in 1929, approximately 33% are now alive and apparently cured. This result is not so good as it appears, because the greater number of the 33% of cured patients come from what we consider to be the favourable group, namely those with no palpable glandular involvement at the commencement of treatment. Of the unfavourable group, namely those patients in whom there were palpable glands at the time of treatment, only two now survive, and I am of the opinion that the result in these two cases was due more to other causes than to the method of treatment. In most of the patients with glandular involvement who received treatment by radiation

there was some improvement. This amounted in a few instances to a temporary disappearance of the glands, and in others to a shrinkage or regression of the glands.

In the majority even of the unfavourable cases there has been at first considerable diminution of pain. Subsequent treatments to the glandular growths were never so effective as the first.

In the majority of cases with secondary glands the period of survival ranged from a few weeks to eighteen months, although the average survival time was seven to eight months.

Finally, I cannot close without briefly calling attention to the fact that in most other parts of the world treatment is being carried out in one or more centres by means of radium teletherapy, or the radium bomb as it is more popularly called. If one can judge by the reports which we have received, the results by this method are certainly an improvement on any others so far obtained. The one objection raised to this method is the expense of its initial installation. The expense of upkeep is comparatively small. We in Australia have not a single centre where our patients can receive the benefit of this method of treatment. There is room for the establishment of at least one centre.

RODENT ULCER: ITS DEVELOPMENT ON THE LIMBS.[1]

By SIR HENRY NEWLAND,
Adelaide.

IN Bland Sutton's classical work on "Tumours, Innocent and Malignant" the following statement occurs with reference to the situations in which rodent ulcer develops:

> Although rodent cancer arises mainly in the facial situations already mentioned, it may occur on the neck and the pinna; it has been met with on the trunk, but never, so far as I know, on the limbs.

Those who have seen much of this disease in Australia know that the last statement is not correct. I have examined the notes of over six hundred private cases of rodent ulcer, and have found five examples of rodent ulcer of the upper extremity, three in males and two in females. The ages of the males were seventy-three, sixty-eight and fifty-nine years, and of the females seventy and sixty-eight years. The growths had been present for the following periods: ten, thirteen, eleven, twelve and ten years. In the males the right limb was affected twice and the left once. In the females the right limb was affected in one and the left in the other. The situation of the growth on the limb was as follows: the back of the wrist, the antero-external aspect of the elbow, and the middle of the radial border of the forearm in the males, and the front of the elbow and the middle of the flexor aspect of the forearm in the females. Associated with the rodent ulcers were other growths in every instance but one. The man with the rodent ulcer on the back of the wrist had two rodent ulcers on the left side of the face; the man with the rodent ulcer of the elbow had an epithelioma of the lower lip; the woman with the rodent ulcer in front of the elbow had a rodent ulcer on the right side of the upper lip and another on the right side of the nose. In two of the men the ulcer measured 2·5 centimetres (one inch) in diameter, and in the third the ulcer measured 10·0 centimetres (four inches) by 5·0 centimetres (two inches). This large ulcer was adherent to the head of the radius and the external condyle of the humerus, and the condition demanded amputation above the elbow. The ulcer in front of the elbow in the female was approximately 2·5 centimetres (one inch) long by 1·25 centimetres (half an inch) wide, and that in front of the forearm about 18 millimetres (three-quarters of an inch) in diameter.

All the growths were situated on regions of the upper extremity subject to exposure to the weather, and the skin in all the patients showed evidence of this. Two of the men cited injuries to explain the development of the growth. The ulcer on the back of the wrist was attributed to a scratch caused by barnacles in cleaning a boat, and the large ulcer in the region of the elbow was said to have originated in the bite of a horse. If inquiry is made regarding the exciting cause of a rodent ulcer, it is striking how often the development of the growth is ascribed to injury. I could give many instances, but must confine myself to the following: a splinter from the hammer of a gun, a burn, a scratch from a falling almond, a prick with scissors, a razor cut, and lastly pulling out a hair.

I have seen one example of a rodent ulcer on the lower extremity. The patient was an elderly female. For many years she had had two ulcers situated over the upper end of the sternum and another on the right buttock. Those at the root of the neck had been treated elsewhere with radium. On the right buttock there was an ulcer measuring 5·0 centimetres (two inches) by 3·75 centimetres (one and a half inches). A microscopic section proved it to be a rodent ulcer. The situation of these ulcers at first led me to think that they were of syphilitic origin. Treatment in that belief was fruitless, and subsequently the ulcers all responded to the method of treatment now to be described.

It has been my custom to treat early rodent ulcers in the following way. If the growth has attacked the bone, cartilage or conjunctiva, the method is not used. A local anæsthetic is injected around the growth. I first of all used a solution made from eucaine B and hemisine. I now use "Novocain" put up in cartridges for loading a special syringe; the combination is exceedingly convenient. When the part is anæsthetic the growth is curetted with a stainless steel curette. A rodent ulcer yields to a curette just like granulation tissue, and a smooth surface is left. I can tell at once from the contact of the curette with the growth whether the growth is a rodent ulcer or an epithelioma. At first I had a microscopic section cut in every case to confirm the diagnosis; I rarely find it necessary to do so now.

After a thorough curetting only a thin layer of the rodent ulcer cells is likely to remain. These are

[1] Read at the Seventh Australian Cancer Conference, Melbourne, May, 1936.

still further reduced by searing the raw surface with an electric cautery. This has the advantage of leaving a dry surface as well as destroying cancer cells. One or two radium plaques are now applied without a filter to the curetted surface and to the edges for an hour. When the area has been treated with the ten-milligramme plaques in this way, the process is repeated, a thin filter being used. Except in the case of very insignificant growths, an erythema dose of X rays is given as well. This treatment may be thought to be overdoing it. Certainly it is effective, for I have had very few recurrences indeed, and the cosmetic results have been excellent.

PRIMARY CARCINOMA UNSUSPECTED BY THE CLINICIAN.[1]

By A. J. TRINCA and R. A. WILLIS.

(From the Baker Medical Research Institute, Alfred Hospital, Melbourne.)

THE spread of carcinoma and of other malignant tumours follows no rigid rules, and both the pathologist and the clinician must constantly be prepared for the unexpected in the behaviour of neoplasms. Departures from what is considered to be the usual mode of extension and metastases of any given kind of primary growth are a frequent cause of confusion in clinical diagnosis. Especially may precocious or clinically obtrusive metastases be regarded as primary growths. Mistakes of this kind are constantly being made in both private and hospital practice; and wider appreciation of this fact should lead to more critical analysis of histories and more thorough search for possible primary growths.

One of us[1][2] has already laid stress on this aspect of malignant disease and has published many illustrative case reports. The present paper describes some previously unreported examples of the same kind, based on *post mortem* findings and clinical records. The diagnostic mistakes described fall into three main groups: (i) secondary tumours were mistaken for primary tumours; (ii) the primary site of disease was correctly diagnosed, but its neoplastic nature was not recognized; (iii) widespread but unsuspected malignant disease was discovered only at autopsy or at operation for some unrelated condition. The following reports, however, are arranged according to the nature of the responsible primary tumours. We have confined our attention to cases investigated by reasonably competent clinicians, mostly in major public hospitals; mistakes due to obvious carelessness or ignorance are not considered. Whereas the cases cited are examples of inoperable malignant disease, it can be appreciated that an attitude towards carcinoma, which this paper endeavours to teach, should result in the diagnosis of malignant disease in some cases in an operable stage. Too many cases of malignant disease are discovered only at autopsy. The number of cases so discovered could have been greatly increased had a systematic search been made through hospital and other records. The fact that nineteen cases were thought of off-hand, as it were, and were really recalled from memory when we discussed writing this paper shows how common are the mistakes to which we draw attention. Our object in recording the cases has not been to criticize the clinician unkindly or in a carping spirit, but to aid him by informing him better of the traps into which he may fall. To recognize past errors is to guard against future ones. Our title is not intended to suggest that in every case the clinician remained throughout wholly unsuspicious of the nature of the disease (though this was true of a number of the cases), but that he was misled by secondary manifestations for at least a considerable part of the patient's illness.

[1] Read at the Seventh Australian Cancer Conference, Melbourne, May, 1936.

Carcinoma of the Oral Cavity or Pharynx.

Symptomless primary growths in the pharynx, tonsil or base of the tongue may produce large metastases in the cervical lymph glands which may be mistaken for primary tumours in the neck. This is exemplified by the following case.

CASE I.—A.N., a man of sixty-four years, consulted his doctor because of a small lump which had appeared six months earlier in the left side of his neck. This was thought to be a primary tumour and was excised. Microscopically it proved to be carcinomatous, consisting of large clumps of active undifferentiated epithelial cells. The growth recurred and grew to a diameter of five centimetres within a few weeks; and the patient was admitted to hospital and treated by interstitial application of radium. Examination of the pharynx, larynx and œsophagus about this time revealed no abnormalities; but a few weeks later a small carcinomatous ulcer was discovered behind the right tonsil, which was now becoming prominent. The patient died within two months. The condition was clearly one of lymphatic metastasis or extension into the neck from an otherwise symptomless small primary carcinoma of the tonsil.

Carcinoma of the Stomach.

Gastric carcinoma may itself remain relatively symptomless while yet producing clinically prominent metastatic growths in the peritoneum, ovaries or more remote parts. Even when gastric symptoms are present, however, metastatic growths may so engross the clinician's attention that he overlooks the significance of the patient's "indigestion" or loss of weight.

CASE II.—H.D., a young man, twenty-two years old, attended hospital complaining of recent indigestion, vomiting attacks and loss of weight. A test meal revealed that free hydrochloric acid was absent. Skiagraphic examination after a barium meal showed no definite gastric abnormality. A small, firm tumour of the buttock, which was thought to be a fibroma, was excised, and a microscopic diagnosis of "colloid carcinoma" was made. Because of the patient's age, however, the surgeon was disinclined to accept the pathologist's opinion as final. Laparotomy was performed and revealed widespread nodular thickening of the cardiac part of the stomach, scattered nodules on peritoneal surfaces and much free fluid in the abdominal cavity. Even then the condition

was regarded as possibly syphilitic; but subsequent autopsy showed carcinoma of the stomach with metastases in peritoneum, many lymph glands and lungs.

CASE III.—F.R., a male of forty-six years, was admitted to hospital under the diagnosis of right inguinal hernia. He had had the hernia for years, but recently it had enlarged and become painful at times. He had also suffered recently from indigestion and nausea after meals, with some loss of weight; and there had been recent enlargement of the inguinal lymph glands on both sides. At operation on the hernia it was noticed that the wall of the sac exhibited nodular thickening; and some free fluid, thought to be "sero-pus", escaped from the abdominal cavity when the sac was opened. Microscopic examination of the wall of the sac showed transperitoneal implants of spheroidal-celled carcinoma. No doubt these were secondary to a carcinoma of the stomach, though the primary site of the disease was not proved conclusively. The final fate of the patient is not known.

CASE IV.—L.S., a young woman of twenty-one years, underwent urgent operation on account of a twisted ovarian tumour which proved to have the characters of a Krukenberg tumour. At the operation a primary carcinoma of the stomach was also discovered. This had not been suspected clinically, although the patient had lost weight and had complained of "indigestion". She had been a trainee at a large public hospital and had been dismissed by the matron because she was always ill and tired and "not strong enough for nursing". She was then nineteen, and the possibility of carcinoma in a girl of this age was not even considered.

Carcinoma of the Intestine.

Like gastric carcinoma, intestinal carcinoma may deceive the clinician by its intraabdominal or remote blood-borne metastases. The following is a probable instance of the latter event.

CASE V.—Mrs. P.H., aged forty-four years, suffered from an acute attack of colicky abdominal pain followed by diarrhœa. Cerebral symptoms, regarded as "toxic" in nature, developed and coma supervened. A neurologist expressed the opinion that a cerebral tumour was present, and a decompression operation was undertaken. The patient died soon after the operation. *Post mortem* examination, restricted to the brain only, revealed a metastasis of columnar-celled adeno-carcinoma. The origin of this was believed to have been a primary intestinal growth, since it was ascertained that the patient had suffered from previous attacks suggestive of partial intestinal obstruction.

The two following cases of intestinal cancer, though not presenting any unusual metastases, are recorded briefly in order to stress the importance of rectal examination for early diagnosis, and also because of the noteworthy development of similar growths in father and son.

CASE VI.—C. senior, a Chinese orchardist, aged about seventy-two years, had suffered for fifteen months from attacks of diarrhœa, usually following a feed of fruit. During this period his doctor prescribed astringent mixtures and dietetic treatment. Finally a hæmorrhage from the bowel occurred and led to rectal examination, when an inoperable carcinoma of the rectum was discovered. Until the hæmorrhage there had been no symptoms referable to the rectum. Colostomy was performed, and the patient subsequently died.

This patient's son, C. junior, aged about forty-six years, sought medical advice on account of diarrhœa for three weeks, ascribed to a feed of gooseberries. Save for some recent loss of weight, there had been no other symptoms. Because of the experience with the father, the doctor performed a rectal examination and an inoperable carcinoma of the rectum was found. The fate of the son was identical with that of his father.

Carcinoma of the Liver.

Secondary tumours in the liver are extremely frequent, and they may produce great enlargement of the organ, while the primary growth in the stomach, bowel or elsewhere remains small and otherwise symptomless. For these reasons it is impossible for the clinician to make a confident diagnosis of primary carcinoma of the liver. That is a diagnosis which can be made only after complete autopsy has excluded the possibility of a primary tumour elsewhere in the body. The following case fulfils that condition and also illustrates unusual diagnostic difficulties occasioned by the metastases of a carcinoma of the liver.

CASE VII (*post mortem* reference number 341).—E.M., a woman of forty-one years, attended hospital as an outpatient in December, 1934, complaining of persistent backache of six months' duration. Physical therapy was prescribed, but with no benefit. As she had had some vaginal discharge she was then referred to the gynæcological out-patient clinic, where, however, no cause for the backache was discovered. Soon after this the pain became more severe and stabbing in type, radiating pain developed in both legs, and then paraplegia with loss of sphincter control supervened. In this condition the patient was admitted to hospital in February, 1935. Skiagrams revealed extensive areas of destruction in the lumbar vertebræ and pelvis. During the last month of life a fluctuant paravertebral swelling developed in the left loin; from this were aspirated 80 cubic centimetres of sterile dark brownish fluid, microscopic examination of which revealed many large cells which were considered to be tumour cells. Developing severe cystitis and bed sores, the patient died in May, 1935, eleven months from the commencement of her illness. Autopsy revealed a large tumour of the left lobe of the liver, with metastases in other parts of the liver, in the portal lymph glands, peritoneum, left ovary, lumbar vertebræ and pelvis. Careful search failed to discover a primary growth in any of the other viscera. Microscopically the tumours exhibited a scirrhous type of adenocarcinoma, presumably of bile duct origin (cholangioma).

Carcinoma of the Lung.

Carcinoma of the lung is notorious for the frequency with which it eludes correct diagnosis and deceives the clinician by its metastases or by its intrathoracic complications. In the past year five cases of this disease have been subjected to autopsy at the Alfred Hospital; and in four of these cases the clinical diagnosis had been incorrect. The four cases were briefly as follows.

CASE VIII (*post mortem* reference number 355).—T.V., a man of fifty-five years, was first admitted to hospital in July, 1934, with signs and symptoms typical of left basal lobar pneumonia of sudden onset. The temperature declined by lysis within a week, the abnormal signs in the lung gradually cleared up, and the patient left hospital within three weeks of the onset. He was readmitted fourteen months later, complaining that he had never felt well since his previous admission. He had had stabbing pains at times in the left side of his chest, he had lost weight, and recently he had had a cough with blood-tinged sputum. Examination revealed signs of irregular consolidation of the base of the left lung. Skiagrams disclosed two rounded areas of shadow of doubtful nature in the left lung. Casoni and Wassermann tests both yielded negative results. Some semi-purulent fluid aspirated from the chest contained pneumococci and some Gram-negative bacilli. There was swinging pyrexia for the last few weeks of life. Autopsy in September, 1935, revealed a huge mass of growth replacing the lower lobe of the left lung, with widespread suppurative bronchopneumonia of

the remainder of the lung and loculated pleural collections of pus. Tumour deposits were present in many of the mediastinal lymph glands, but all other viscera were free from growths. Microscopically the tumour was a richly cellular anaplastic carcinoma. A remarkable feature was that the tumour had invaded not only the pulmonary vein, but also the main left pulmonary artery at the hilum of the lung.

The history of this case admits of little doubt that the patient's initial illness was really due to inflammatory complications of the neoplasm in the form of what appeared clinically to be simple lobar pneumonia.

CASE IX (*post mortem* reference number 364).—A.H., a man of seventy-seven years, was admitted urgently to hospital. For seven days past he had had colicky abdominal pain, which in the last twenty-four hours had been more severe and had been accompanied by vomiting and abdominal distension. Laparotomy revealed great distension of the colon, and transverse colostomy was performed. The patient died soon after the operation. Autopsy revealed that the cause of the intestinal obstruction had been volvulus of the sigmoid colon. In addition, as an entirely unsuspected finding, there was a carcinoma of the lower main branch of the right bronchus with widespread radiating extensions in the hilum of the lung; multiple areas of invasion of the main right pulmonary vein were present and nodular invasion of the posterior aspect of the pericardial cavity. There were also metastases in the mediastinal and lower cervical lymph glands, a large metastasis in the right adrenal gland, and several metastases in both cerebral hemispheres. Microscopically the tumour was a highly cellular anaplastic carcinoma.

CASE X (*post mortem* reference number 378).—B.M., a woman of fifty-one years, was admitted to hospital in January, 1936, complaining of cough for the previous eight months and swelling of the abdomen and dyspnœa for two months. Examination revealed abundant ascitic effusion in the abdomen and rather indefinite physical signs in the lungs. Skiagrams of the chest revealed somewhat increased hilar shadows. No tubercle bacilli could be found in the sputum, but the clinician leaned to the diagnosis of tuberculous peritonitis. Microscopic examination of some aspirated ascitic fluid, however, revealed many large clumps of undoubted tumour cells. Bilateral pleural effusions then developed and the patient died within two months of her admission to hospital. Clinically the primary site of the disease was undetermined. Autopsy revealed a carcinoma of the left main bronchus with extensions outwards along the peribronchial tracts, scattered small metastases in both lungs and pleuræ, and metastases in the pericardium, heart muscle, liver, gall-bladder wall, left adrenal, both kidneys, pancreas, peritoneum, brain, thyreoid, one rib, both ovaries, and many groups of lymph glands. Microscopically the tumour was a mucoid adenocarcinoma; it consisted partly of mucus-containing glandular acini and partly of packed masses of signet-ring cells without acinar arrangement.

CASE XI.—I.C., a young woman of twenty-nine years, was admitted to hospital in April, 1936, under the diagnosis "? cerebellar tumour". Eight months previously she had been very ill for several weeks with right-sided "pneumonia and pleurisy", during which her chest had been needled several times, but without any fluid being found. She had had a persistent but slight cough since that illness, but in other respects felt well until six weeks prior to her admission to hospital. At that time she began to suffer from severe headaches and from weakness and "pins and needles" in the left limbs. Examination on her admission to hospital revealed spastic paresis of the left limbs, widespread impairment of sensation on the left side of the body, and left homonymous hemianopia. There was no papilloedema. The cerebro-spinal fluid was at increased pressure, but otherwise normal. There were diminished breath sounds and impaired percussion note over the lower parts of the right lung; and skiagrams showed patchy consolidation in the lower lobe, of doubtful nature, possibly unresolved pneumonia, possibly abscess, possibly tumour. The Wassermann test gave no reaction. The clinical diagnosis was "? parietal or parieto-temporal tumour or abscess". The patient became stuporous and died one week after admission. Autopsy revealed an extensive mucoid carcinoma of the basal lobe of the right lung, scattered metastases in the left lung, and metastases in the cerebrum and cerebellum, the largest of which was a huge gelatinous growth, about ten centimetres in maximum diameter, situated centrally in the right cerebral hemisphere. Other viscera were free from growths.

The case is of interest, not only because of the clinical predominance of cerebral disease, but also because of the youth of the patient and because of the history of "pneumonia and pleurisy" (doubtless infective complications of the lung tumour) eight months previously.

Carcinoma of the Kidney.

Carcinoma of the kidney may long remain symptomless, while deceiving the clinician by its metastases. The following reports illustrate diagnostic difficulties in this disease.

CASE XII (*post mortem* reference number 351).—W.S., a man of forty-six years, was first admitted to hospital in August, 1934, for repair of an inguinal hernia and removal of hæmorrhoids. During routine examination it was noted that crepitations were audible at the bases of both lungs. Ten days after the operation he developed bronchopneumonia with a stabbing pain in the chest, a pleural rub and basal dulness and moist sounds. These physical signs gradually improved, but irregular pyrexia, for which no cause could be found, persisted for several weeks. Skiagrams of the lungs disclosed nothing abnormal. In October he began to complain of pains in the left thigh and leg, which increased in severity and on account of which he was readmitted to hospital in December under the diagnosis "sciatica". Skiagrams of the lumbar spine and pelvis failed to revealed any abnormality. The pains persisted, as did also slight irregular pyrexia, and the patient began to lose weight and strength. In March, 1935, an attack of hæmaturia occurred, and pyelography revealed deformity of the left renal pelvis suggesting neoplasm. Soon afterwards a small subcutaneous mass was noticed in the deltoid region of the left arm; this was excised, and it proved microscopically to have the typical structure of clear-celled adenocarcinoma of the kidney. Autopsy in July, 1935, revealed carcinoma of the left kidney (weight 906 grammes), many large and small metastases in both lungs, and metastases also in the myocardium, right kidney, left adrenal, thyreoid, brain, one rib, and the thoracic and cervical lymph glands.

Review of this patient's history leaves little doubt that the post-operative bronchopneumonia was related to the development of the metastatic growths in the lungs, in spite of negative skiagrams at this time.

CASE XIII.—R.H., a man of sixty-five years, attended hospital as an out-patient in May, 1930, complaining that four weeks previously he had had an attack of severe left-sided precordial pain. The pain had since become less severe, but had persisted. Examination revealed extensive arteriosclerosis, slight cardiac enlargement, accentuation of the aortic second sound, a systolic blood pressure of 250 and a diastolic pressure of 130 millimetres of mercury, and slight œdema of the ankles. The electrocardiographist reported: "Very poor *T* waves in all leads, definite left-sided preponderance. The tracings are quite compatible with a diagnosis of coronary thrombosis." In June the man was admitted as an in-patient under this diagnosis. Skiagrams of the thorax revealed general cardiac and aortic enlargement, small bilateral pleural effusions, and also multiple metastatic growths in several ribs with pathological fractures in the fifth, sixth and seventh left

ribs. In spite of careful reexamination of the patient, the nature and origin of these growths remained quite obscure. Death occurred in July, 1930, and autopsy revealed a primary carcinoma at the lower pole of the left kidney, three by two centimetres in size, with multiple metastases in the liver and in the ribs. Microscopically the tumour was the usual clear-celled type of renal carcinoma. The heart was small and showed no signs of coronary infarction.

It is clear that the severe precordial pain which had been regarded as due to cardiac disease had really been caused by the pathological fractures of the diseased ribs.

CASE XIV.—C.B., a man of fifty-seven years, first attended hospital as an out-patient in January, 1935, complaining of a lump which had appeared recently in the floor of his mouth. This was thought to be a cyst and was excised; it was not sent for pathological examination. The patient returned five months later with a recurrent growth in the same situation. He was admitted to hospital in July, by which time there was a projecting, lobulated, slightly ulcerated, firm growth, 2·5 centimetres in diameter, attached to the right side of the posterior part of the tongue and occupying the adjacent part of the floor of the mouth; moderate enlargement of the submaxillary and submental lymph glands was also present. Diathermy excision of the growth in the mouth was carried out, and microscopic examination of this revealed a clear-celled type of carcinoma structurally identical with renal carcinoma. Reexamination failed to detect any palpable renal enlargement and there were no urinary abnormalities. Pyelograms were attempted, but were unfortunately not satisfactory, and before they could be repeated the patient left hospital for domestic reasons. He subsequently attended as an out-patient for X ray therapy.

CASE XV.—H.J., a man of fifty-six years, consulted his doctor on account of increasing jaundice for the previous four weeks, with more recent nausea and occasional vomiting. Save for some recent loss of weight, there had been no other symptoms, and his previous health had been excellent. Examination disclosed that the patient was deeply jaundiced, that there was some general enlargement of the liver and right hypochondriac tenderness, and that the systolic blood pressure was 205 millimetres of mercury; but no other physical abnormalities were present. The urine contained bile salts and pigments, and stercobilin was absent from the fæces. Fouchet's test gave a positive result and Van den Bergh's test gave a prompt direct reaction. A test meal revealed achlorhydria, but no other abnormality of the gastric contents. Skiagrams disclosed much spasm of the pyloric part of the stomach, but nothing conclusive of carcinoma. Cholecystograms exhibited a large, faintly filled gall-bladder with very poor concentration of bile. Operation was undertaken; a large gall-bladder distended by thick, black, tenacious bile was discovered. The lumen of the upper part of the common bile duct contained a smooth, elongated mass of friable growth, which was scraped and pulled out by forceps. A mass the size of a mandarin, hard in parts, cystic in parts, could be felt in or attached to the lower pole of the right kidney. Microscopic examination of the tissue removed from the common bile duct showed the characteristic structure of clear-celled renal carcinoma. The patient died within a few weeks without having suffered at any time from renal symptoms.

Carcinoma of the Breast.

In spite of the accessibility of the breast to examination, primary carcinoma of this organ may elude discovery, and the clinician may be deceived by metastatic growths. We would urge that palpation of the breasts should become a part of the routine clinical examination of female patients. Cancer of the breast is notorious in that many of the victims of this disease notice it first when it is already in an advanced stage. In taking the histories of patients with lumps in the breast, it is common to find that some months previously the patient has had her heart or lungs examined by a doctor for some other condition; yet the mass in the breast, which was almost certainly present at that time, was not discovered. Routine examination of the breasts of every woman who consults a doctor would result in the discovery of many mammary growths in an operable stage.

CASE XVI.—C.B., a woman of thirty-seven years, first sought medical advice in April, 1931, on account of increasingly severe attacks of aching and stabbing pain in the back and left loin during the previous twelve months. Skiagrams were taken by a well-known, highly competent radiologist, who reported that there were six lumbar vertebræ, that the vertebræ exhibited spondylitic spurs, and that the body of the fifth lumbar vertebra showed irregularity in its upper left quadrant, where there appeared to be several small areas of osteoporosis surrounded by narrow sclerotic zones; the ætiology was doubtful, but some low-grade chronic osteitis was suggested. The patient was admitted to hospital for further investigation. General and neurological examination revealed no noteworthy abnormality; and the same was true of urine examination, cystoscopy, dye excretion tests, Wassermann tests, examination of cerebro-spinal fluid, skiagrams of the spine following *cisterna magna* puncture and the introduction of descending lipiodol and skiagrams following a barium enema. The posterior roots of the twelfth dorsal and first and second lumbar nerves were injected with alcohol and "Novocain", but without diminution of the pain. The patient was discharged with the diagnosis of "Spondylitis". She was readmitted to hospital in June, 1932, that is, about twelve months later. The pains in the back had become worse, and for four months she had noticed a lump in her left breast. Examination of the breast revealed a hard mass, seven by five centimetres, attached to both the skin and deep fascia. Skiagrams now revealed obvious areas of metastatic growth in the lumbar vertebræ. Radon seeds were introduced into the breast and X ray therapy was applied to the spine.

The history of this patient emphasizes the need for careful examination of the breasts in all obscure illnesses in women. In this case many special diagnostic investigations were carried out, but so simple a procedure as palpation of the breasts was neglected, and it was the patient herself who eventually discovered the primary tumour about twenty months after the onset of symptoms due to spinal metastases.

CASE XVII (*post mortem* reference number 365).—E.H., a woman of sixty-two years, had suffered from attacks of vomiting on and off for three years and from more recent weakness and loss of weight. Because of these symptoms and because of palpable gross enlargement of the liver, her doctor recommended her admission to hospital as a case of "carcinoma of the stomach". Examination after admission, however, revealed also a small scirrhous carcinoma of the left breast with axillary metastases. Autopsy a few weeks later showed a carcinoma 2·5 centimetres in diameter beneath the left nipple, large metastases in the axilla, and multiple deposits also in the lungs, liver, upper abdominal lymph glands, skull, nearly all the vertebræ and the pelvis.

The case is instructive in that it illustrates the development of widespread and clinically obtrusive metastases from a small symptomless mammary tumour. Here also, as in the previous case, examination of the breasts would have saved the doctor from an easily avoidable diagnostic mistake.

Malignant Melanoma.

It cannot be too strongly emphasized that small, seemingly innocuous melanotic growths of the skin may be the source of widespread metastases. The clinician who fails to make a thorough examination of the surface of the body or who overlooks the fact that his patient has had a small skin tumour excised some months or years previously will from time to time be seriously misled by metastatic melanomata. The following cases illustrate such mistakes.

Case XVIII (*post mortem* reference number 324).—F.S., a man of fifty-six years, was admitted to hospital in February, 1935, under the diagnosis of "cerebral tumour". He was confused and unable to describe his illness, the history of which was obtained from his daughter. He had been well until four weeks earlier, when he had begun to suffer from loss of memory, stupor and drowsiness. Examination on his admission to hospital disclosed papilloedema and retinal hæmorrhages, and lateral nystagmus in both directions, but no other noteworthy neurological abnormalities. The cerebro-spinal fluid was under increased pressure and showed a trace of globulin, but no increase of cells. The Wassermann test gave no reaction in either blood or cerebro-spinal fluid. Just before the patient's death, which occurred only three days after his admission, it was noted that his skin contained a few small pigmented moles, one of which, on the back, measured one centimetre in diameter and was ulcerated. Autopsy disclosed many pigmented growths up to two centimetres in diameter scattered in all parts of the brain, similar metastatic growths in the peritoneum, pericardium, retroperitoneal and mediastinal tissues, and one small nodule in the medulla of the left adrenal. Microscopically the growth was a spindle-celled and spheroidal-celled melanoma, in some parts deeply pigmented, in other parts non-pigmented.

Case XIX (*post mortem* reference number 345).—M.J., a man of forty-two years, began in March, 1935, to suffer from headaches, giddiness and vomiting, and later from failing vision and mental dulness; he was admitted to hospital in April under the diagnosis "cerebral tumour". Save for the presence of papilloedema, neurological findings were indefinite. The cerebro-spinal fluid was under increased pressure but not otherwise abnormal. A firm mass, three centimetres in diameter, was present in the upper part of the left side of the neck; but no primary growth could be found in the upper respiratory or alimentary passages. Skiagrams of the lungs revealed multiple metastatic growths. Death occurred in June, 1935, without any diagnosis more definite than disseminated malignant disease having been reached. Autopsy revealed widespread melanotic growths in the cervical lymph glands, lungs, brain, intestinal mucosa, both adrenals, pancreas and skin. In view of the autopsy findings, fresh significance was attached to the fact that some months earlier the patient had been treated at a country hospital for some lesion of the skin of the face. Correspondence with this hospital now disclosed that a small "epitheliomatous growth" of the left side of the neck had been excised in May, 1934. This growth had not been examined microscopically; but, in view of the subsequent history, there can be no doubt that it was the responsible primary melanoma.

Conclusions.

As a practical aid to the clinician in his striving to avoid mistakes of the kind outlined in this paper the following conclusions may be formulated.

1. In all obscure cases the clinician should think of the possibility of disguised malignant disease. Observance of this general rule will eliminate many mistakes.

2. Youth of the patient does not exempt him from this possibility. In our Cases II, IV and XI the ages of the patients were twenty-two, nineteen and twenty-nine respectively.

3. Physical examination must be complete. All obscure alimentary symptoms call for rectal examination, witness our Case VI. Obscure illnesses in women call for examination of the breasts, witness our Cases XVI and XVII. Examination of the entire skin surface is important, as is also the history of previous skin lesions, witness our Cases XVIII and XIX. Masses of obscure nature in the neck call for thorough and repeated examination of the fauces and pharynx, witness our Case I.

4. Metastatic growths in the brain frequently simulate primary cerebral tumours, witness our Cases VII, XI, XVIII and XIX. Carcinoma of the lung is the primary growth most often to blame. In all cases of "cerebral tumour" skiagrams of the lungs should be obtained, in search of (*a*) a possible primary growth in the lungs, or (*b*) metastatic growths in the lungs from other sources.

5. Metastatic growths in bones frequently simulate other diseases, witness our Cases VII, XIII and XVI. "Spondylitis", "sciatica" and "rheumatic pains" should be investigated thoroughly with this possibility in mind. Although this paper does not record an example of the kind, supposedly "primary" tumours of bones not infrequently prove to be metastases; and the clinician should ask himself of every bone lesion he sees: "Could this possibly be a metastatic growth?"

6. Metastatic growths in the ovaries frequently simulate primary growths, witness our Case IV. When proposing to operate on an ovarian tumour, the surgeon should first inquire very closely for "indigestion" or other symptoms of alimentary disease; and when operating he should examine the stomach, intestine and gall-bladder for possible primary growths. The stomach is the most frequent site of relatively symptomless and unsuspected primary carcinomata with large ovarian metastases.

7. Metastatic growths in the liver are far more frequent than primary growths. Hence, when confronted by neoplastic enlargement of the liver with no clinically obvious primary source, the clinician should never make a diagnosis of "primary hepatic carcinoma". That is a diagnosis which can be sustained only after thorough autopsy, as in our Case VII.

8. Metastatic growths may appear in all sorts of odd situations, for example, in the buttock in our Case II, in the deltoid area in Case XII, in the floor of the mouth in Case XIV, and in the bile duct in Case XV. Unsuspected carcinoma of the kidney is probably the most frequent source of metastatic tumours in unexpected places.

9. Pulmonary infections may be the first evidence of primary or metastatic tumours in the lungs. Thus in our Case VIII the patient's illness dated from an attack of "lobar pneumonia"; in Case XI "pneumonia and pleurisy" heralded the illness; and in Case XII post-operative "bronchopneumonia" was the onset.

Acknowledgements.

We desire to express our thanks to the honorary staffs of the Alfred Hospital and the Austin Hospital, Melbourne, for details of cases under their care.

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DEEP X RAY THERAPY IN THE TREATMENT OF CANCER OF THE TONGUE.[1]

By W. R. FRAYNE, M.B., B.S. (Melbourne),
Perth.

AT the Perth Hospital before the end of 1933 most cases of epithelioma of the tongue were treated by interstitial application of radium irrespective of the size and location of the lesion. This was sometimes followed by moderate courses of deep X ray therapy to the gland areas, and in favourable cases a surgical dissection of the neck. This combination has proved quite satisfactory for early cases, when the area involved is small, and I still use it when the diameter of the lesion is 1·5 centimetres or less.

When the primary lesion is larger, this method has not been altogether successful. There is considerable difficulty in achieving an even intensity of irradiation throughout the field, especially when the posterior portion of the tongue is involved. A critical survey of the cases treated in this manner shows that failures have occurred because portions of the field received less than the necessary minimum dosage. At the same time other portions of the field have received a considerable overdosage and areas of troublesome radio-necrosis have resulted. Frequently death has occurred from hæmorrhage arising in these areas. I have dispensed with radium in many of these cases with a definite improvement in results.

When the primary lesion involves the middle or posterior third of the tongue, an oral toilet is started, and as soon as practicable an extensive course of deep therapy is commenced. I like to administer about 150 *r* units (measured in air) to each side of the neck every day, one field being treated in the morning and one field in the afternoon. Heavy filtration and a relatively long focal skin distance are desirable.

In hospital practice some compromise usually has to be made, and one treatment of 250 to 300 *r* units is usually given each day. The fields are arranged so that the primary lesion comes into the field of irradiation. This treatment is continued until the end of the second week. At this time an inspection usually shows that the primary lesion has definitely retrogressed. If this is so, the treatment is continued until a definite reaction of the mucous membrane appears. Treatment is usually stopped when the first small breaches appear in the mucosa. The reaction increases during the next few days and an extensive pseudo-diphtheritic membrane covers the irradiated portion of the tongue and mouth. The skin of the neck breaks down about a week after cessation of treatment and usually takes about two weeks to heal, by which time the primary lesion has usually healed. As a rule somewhere between 3,000 and 4,000 *r* units are given to each field. This usually requires between three and four weeks; the time varies greatly in different individuals and also according to the size of the field employed. If thought desirable, a block dissection of the neck may be done in about two months' time. In favourable cases there is surprisingly little difficulty in the dissection.

If no retrogression of the primary growth has taken place after two weeks' treatment, it probably means that a more resistant type of growth is present. I then implant radium needles and confine the remainder of the X ray treatment to the gland areas if possible. The X ray treatment is not pushed to extreme limits and a dissection of the gland areas is advised about two months after treatment.

When the lesion involves the anterior third of the tongue only, I prefer to use interstitial application of radium for the primary lesion, followed immediately by a moderately heavy course of deep therapy to the gland areas, usually 2,500 to 3,500 *r* units to each side of the neck over a period of three weeks. This may be followed by a surgical dissection of the gland area after a lapse of about two months.

The six patients reported presented themselves at my clinic for treatment during the year 1934. Case II was still regarded as being in Stage 1, but proved rather extensive for treatment by interstitial application of radium. Treatment by deep therapy, had it been successful, would have avoided the extremely painful radio-necrosis of the tongue.

The other five cases were advanced and were considered to be in Stage 3. Case V was unsuccessful. I would now treat a case of this type from both sides of the neck and give a somewhat greater total dosage. In Cases I and IV the treatment of the tongue and neck was apparently successful, but one patient succumbed to distant metastases and the other to Bright's disease. In Cases II and VI the treatment has been very successful and a period of twenty-six months in one case and of eighteen months in the other has elapsed since their treatment commenced.

Interim Report of Six Cases of Carcinoma of the Tongue Treated during 1934.

Case I.

J.G., a male, aged sixty-four years, suffering from a Stage 3 growth, was seen on February 20, 1934. He had had difficulty in swallowing for the previous three months. He had lost 6·3 kilograms (one stone) in weight and occasionally spat up blood.

Examination revealed a large fungating tumour occupying the base of the tongue and spreading onto the anterior pillar of the fauces and the left tonsil. The left submaxillary gland and the superficial and deep cervical glands on the left side were enlarged.

[1] Read at the Seventh Australian Cancer Conference, Melbourne, May, 1936.

Deep therapy was commenced with the constant potential machine through two lateral portals measuring fifteen by fifteen centimetres. Daily treatments of about 200 *r* units (measured in air) were given to the left side of the neck. A total of 3,500 *r* (in air) was administered in eighteen days, followed by a total of 3,400 *r* (in air) to the right side in twenty-eight days. Altogether 6,900 *r* (in air) were given during forty-six days. As a result the primary lesion healed entirely and the gland masses disappeared. This patient died on August 20, 1935, from renal insufficiency, and at the time of his death there was no evidence of any recurrence in the tongue or neck.

Case II.

F.T., a male, aged seventy years, suffering from a Stage 1B growth, was seen on February 27, 1934. He gave a history of having noticed a lump on the tongue nine weeks previously and he had lost 9·5 kilograms (one and a half stone) in weight. The Wassermann test gave no reaction.

Examination revealed a large fungating growth on the underneath surface of the tongue, 3·5 centimetres in diameter. The mass was hard and indurated and the tongue protruded poorly. No glands were palpable.

Thirty milligrammes of radium in triple strength needles, filtrated with 0·5 millimetre of platinum, were buried in the tongue for seventy-two hours. Immediately following this, deep therapy was commenced with the constant potential machine, 1,600 *r* (in air) being administered to each side of the neck during a period of ten days. The site of the primary lesion was not included in the direct beam of X rays. Three months later a necrotic ulcer was removed from the tongue by diathermy and a block dissection of the right side of the neck was performed. No neoplastic glands were present.

This patient has remained well to date and there is no evidence of any recurrence.

Case III.

E.H., a female, aged sixty-two years, suffering from a Stage 3 growth, was seen on March 27, 1934. She gave a history of having noticed a sore on the tongue three months previously and complained of pain in the tongue and right ear.

Examination revealed a large ulcer on the right lateral side of the tongue extending onto the floor of the mouth and over the mandible. There was considerable infiltration of the floor of the mouth, but the bone was not yet invaded. There were palpable glands on the right side of the neck.

Deep therapy was commenced with the constant potential machine; 1,200 *r* units (in air) were administered to each side of the neck through a portal fifteen by fifteen centimetres, and this was followed by a further 3,000 *r* units to the right side through a portal eight by eight centimetres. As a result the lesion of the tongue healed and the palpable glands disappeared.

This patient is alive and well, with no induration and no evidence of any recurrence.

Case IV.

A.A., a male, aged fifty-eight years, suffering from a Stage 3 growth, was seen on April 3, 1934. He gave a history that three months previously he had noticed a choky feeling, which had increased, and there had been some difficulty in swallowing. His voice had become hoarse and he had lost weight.

Examination revealed a large mass involving the base of the tongue and extending to the right vallecula. The glands on the right side of the neck were enlarged and hard.

Deep therapy was commenced with the constant potential machine and approximately 200 *r* units (in air) were delivered daily to alternate sides of the neck through a portal fifteen by fifteen centimetres. A total of 3,200 *r* units (in air) was given to each side during a period of five weeks. As a result the lesion of the tongue disappeared and the glands diminished, but one gland in the right tonsillar region remained enlarged and hard. Two months later a dissection of the right side of the neck was performed. Biopsy revealed cuboidal-celled epithelioma.

This patient died on March 14, 1935, and at autopsy the primary lesion and the neck remained healed, with no evidence of recurrence, but there were extensive secondary deposits in the liver.

Case V.

J.T., a male, aged sixty-eight years, suffering from a Stage 3 growth, was seen on April 10, 1934. He gave a history of having noticed pain in the right ear two months previously and at the same time he noticed a lump on the tongue.

Examination revealed a large ulcer about three by four centimetres on the right side of the middle third of the tongue. The deep muscles of the tongue were indurated and extensive glandular enlargements on the right side were present.

Four thousand *r* units were given to the right side of the neck through a portal fifteen by fifteen centimetres during a period of three weeks. As a result there was a definite improvement in the primary lesion, but the skin over the glands broke down and a fungating mass appeared in the neck. This patient died from cachexia in July, 1934, no real benefit having been obtained from the treatment.

Case VI.

S.S., a male, aged sixty-four years, suffering from a Stage 3 growth, was seen on October 9, 1934. He gave a history of having noticed a lump on the left side of the neck three months previously. He also complained of hoarseness and a sore tongue.

Examination revealed a craggy ulcer, 1·5 centimetres in diameter, on the left side of the base of the tongue. There was considerable deep infiltration of the tongue. Enlarged glands were present in the posterior triangle of the neck on the left side.

Deep therapy was commenced with the constant potential machine. The left side of the neck received 4,000 *r* units (in air) and the right side 1,200 *r* units through ports fifteen by fifteen centimetres during a period of four weeks. As a result the primary lesion healed and the enlarged glands disappeared, and this patient is now alive and well.

The X ray machine used is a Watson's constant potential machine which is operated at 200 kilovolts and 10 milliampères tube current. The filter in each case was 2·0 millimetres of copper and 1·0 millimetre of aluminium. The focal skin distance was 50·0 centimetres. The X ray output is 11·2 *r* units (measured in air) per minute.

THE RADIOLOGICAL TREATMENT OF CANCER OF THE TONGUE.[1]

By L. J. CLENDINNEN, M.B., B.S. (Melbourne),
Consulting Radiotherapist, Royal Melbourne Hospital, Melbourne.

IN considering carcinomata of the tongue from the radiotherapy side, we can divide them into three types: (i) hypertrophic, (ii) ulcerative, (iii) infiltrating.

The Hypertrophic Type.

The hypertrophic type of carcinoma of the tongue is unquestionably the most favourable. It is generally seen or felt by the patient earlier than other types, and the greater percentage of this type of case seen in private practice accounts for the very great discrepancy in results obtained in private as compared with public hospital practice. The

[1] Read at the Seventh Australian Cancer Conference, Melbourne, May, 1936.

blood supply is not interfered with, the growth responds readily to radium, and tissue levels are restored, while gland involvement is generally later than in other types.

The Ulcerating Type.

The ulcerating type is generally associated with glossitis, sepsis and defective teeth, is of invasive character, and thus tissues and lymphatics are early involved. A wide area must be treated, and the tissue destruction and accompanying sepsis mean slow healing and more scarring.

The Infiltrating Type.

The infiltrating type is generally first seen in later stages. Perhaps the lesion is a small ulcer or a crack; sometimes it consists of nodules with a wide infiltrating process. Here many factors make radiation difficult: (*a*) the extent of the tumour, (*b*) the fixation of the tongue, (*c*) the tendency to undergo necrotic ulceration, (*d*) bilateral gland involvement.

When the growth extends anteriorly or laterally into the sublingual tissue, the soft tissues in close proximity to the alveolus call for treatment and are radio-sensitive and respond to treatment, but over the alveolus the growth may disappear, leaving bone bare. This is not a true radio-necrotic ulcer and should not be classed as such. When this bone becomes infected, healing is considerably delayed by interference with blood supply from peripheral radiation, and sequestration is very slow. This is a secondary radio-necrotic ulcer and is not due necessarily to an overdose of radium.

Extension into submaxillary tonsillar areas and the root of the tongue will be dealt with later.

Extension to glands must be considered under three headings: (i) cases with no palpable glands; (ii) cases with small mobile glands; (iii) cases with extensive glands, often bilateral.

When no palpable glands are present our routine is to treat the primary growth first and after this reaction is over then to needle the gland area, as we consider that in no case is it safe to leave the glands untreated. In three cases when only the upper gland area has been treated patients have returned with glands deeper or lower down the neck (in two cases in the supraclavicular areas), but all have responded to radium needles. The needling is done under "Evipan" anæsthesia; there is no mortality; the patient is not inconvenienced and returns to work in ten days with no scarring or disfigurement.

When small mobile glands are present we consider it a risk to leave them until after the primary growth has been treated. Surgery is not advocated in these cases, on account of interference with the blood supply and lymphatics; therefore radium is given to the primary growth and gland fields at the same time, and a homogeneous radiation to the whole of the fascial gland-bearing fields is aimed at without any special consideration of individual glands unless they are one centimetre in diameter or larger.

Together with extensive glands we can consider the problem of advanced lingual carcinoma. Statistics will show the failure to effect a cure in these late cases, although much palliative relief is given.

Now, apart from the secondary spread, the primary growth presents many difficulties. It is not that the primary growth is not radio-sensitive; it is known to be so, but the problems are almost entirely those of technique, namely, of obtaining a dose throughout the involved and adjacent areas which is cancericidal but not intense enough to inflict permanent damage on the vasculo-connective tissues. It might be comparatively easy to irradiate homogeneously with needles a large primary growth which has involved perhaps the floor of the mouth, the tonsil and the root of the tongue, if it were not for the consideration of cross-fire from the needles in the glandular area.

Evidences of want of judgement in this regard crop up on the one hand in the shape of recurrences or on the other of true radio-necrotic ulcers, which are caused by overdosage from too great a concentration of radium, too close proximity of needles, inadequate screening or overdosage through cross-fire; these ulcers may appear one to three weeks after the lesion has healed.

To meet these problems we have during the past two years been employing fractionated deep therapy in combination with radium, so far with very encouraging results.

With the experience of late results in a radio-dermatitis of the neck following radium packs given years ago to patients who live in the country and who are exposed for months in the year to a hot sun, we have realized that in Australia we must conserve the skin of exposed parts all we possibly can; this fractionated deep therapy therefore has not been pushed in this case to such a degree that complete resolution of the neoplasm will follow. A dose is given of such quantity that the tumour recedes somewhat, and, after a period to allow the tissues to recover according to Rheinhart's factors, radium needles are implanted in the residual mass.

A tongue can be treated through six useful ports: two submaxillary, firing upwards; two cheek, firing downwards with the patient's mouth open; one submental; one anterior, through the open mouth.

The distance of the centre of the lesion is easily measured from each skin port, depth doses are known, and so the daily effective depth dose can be plotted. Parts nearer one port are further from opposite ports, so total doses of these roughly equal the dose received by the centre.

The tissue coefficient of recovery (which varies with different qualities of radiation) is known and so a graph can be worked out showing these factors, and this cumulative depth dose may be taken to any required level.

In most of our cases the dosage has been taken to between 2,000 and 2,500 *r* (measured with back scattering) with no worrying dermatitis. The tissue dose is allowed to recover to zero concentration

(about five weeks) and then radium needles are implanted in the residuum. In these cases the lower and deeper glands should be needled at the same time, while the upper gland group, in the already radiated area, might be allowed to remain for another six weeks, so that the patient would not be subjected at the one time to the effects of any more treatment than was absolutely necessary.

Radium Technique.

A brief description here of our present radium technique might be made. After experimenting first with radon seeds, then with Muir seeds, we found by experience, confirmed by X ray films, that, no matter what care was taken, the distribution of the seeds was anything but homogeneous; we also found that 0·3 millimetre of platinum was quite insufficient filtration. Later we proved that 0·8 millimetre was preferable to 0·5 millimetre, and we have now for the past five years used no filtration less than 0·8 millimetre of platinum equivalent in gold, the needles being the length of the tissue to be treated. Radon needles of this filtration are necessarily of lesser diameter than those containing radium salt, and they can be bent and curved to fit the part being radiated, for instance the root of the tongue. The initial strength of these now used does not exceed 1·5 millicuries per centimetre length in the tongue, while 1·8 millicuries are used in the neck. The usual dosage is seven days when there is no cross-firing to be considered.

The Problem of Infected Teeth in Relation to Carcinomata of the Tongue.

At the last Cancer Conference the general opinion appeared to be that infected teeth should be left *in situ* while radiation was being carried out, and much time was given to this question—far more than the item warranted.

When sepsis is mild and can be cleared up in a week or ten days by a dentist using conservative measures, by all means save the teeth. But when gross pyorrhœa exists, the leaving of these pus sockets will be an endless source of sepsis in needle implantation, and it is hard enough even in a clean mouth to keep the tongue clean when the threads of the radium needles are in position for the week of treatment; this is aggravated if gross sepsis is also present and the general toxæmia and debility of the patient are increased.

Again, it is quite an illogical surgical procedure to submit a patient with an epithelioma of the tongue and gross pyorrhœa to the mercies of a dentist, who will remove all these teeth under a general anæsthetic, thus opening up widespread tissue spaces and breaking down barriers which have been built to counteract the infective process.

The right procedure appears to be to have several sessions at intervals of two or three days and to remove two, or at most three, teeth at a time. By this means tissue damage is reduced to a minimum and the patient is not seriously inconvenienced. Anæsthesia should be by block methods and as little local anæsthetic as possible should be used, to prevent complications, such as delayed healing *et cetera*.

Small doses of "Evipan" would obviate the disadvantages of a local anæsthetic, but would need to be repeated and would mean hospitalization of the patient.

If the teeth are left till after the radiation, complications of "dry sockets" are even more apt to follow.

Usually the radiation can be postponed for ten days while the teeth are removed and healing has been initiated without detriment to the patient from the point of view of any increase of growth.

The Problem of Carcinomata of the Tongue and Associated Syphilis.

A rather surprising feature of the recent statistical survey is the fact that the prognosis of carcinoma of the tongue is better when a neoplasm has developed on a syphilitic basis.

Further investigation of this is indicated, but it will probably be found that the secondary spread in these syphilitic tongues is relatively much less than that in a similar group of non-syphilitic tongues. It is the glands that kill the patients and not so much the primary growth, and this is probably a manifestation of the chronic interstitial glossitis restricting the lymphatic circulation and hence limiting the tendency to lymphatic spread, which is generally regarded as an embolic rather than a permeation process.

On the other hand, the presence of the interstitial glossitis makes the tongue a less favourable site for radium therapy, as the dilatation of vessels, being part of the normal reaction, is hindered, and stasis is likely to follow, resulting in an immediate or subacute type of radio-necrotic ulcer. Many of these ulcers have been excised with the diathermy knife at the Royal Melbourne Hospital, and in a considerable proportion has been found residual epithelioma, indicating: (i) That epithelioma on a syphilitic basis is not as radio-sensitive as a normal epithelioma. (ii) That the restriction of the tissue spaces by the interstitial fibrosis has tended to restrict an embolic spread, but has favoured a possible invasion of the residual spaces by the epitheliomatous cells which would gravitate along these spaces by a process probably of permeation. This would mean that the malignant process was probably much wider than was apparent, and although it is the custom to irradiate an area well wide of the obvious malignant process in this type of case, the margin is not wide enough, and it seems that this permeation process accounts for the frequent occurrence of residual epithelioma in the margins of radio-necrotic ulcers excised from the tongue some months after the primary irradiation.

Treatment of the syphilitic tongue should be of the usual routine course and may be started concurrently with the radiation treatment. Quite a few cases have been seen in which two to three years have been necessary to make the response to the Wassermann test negative. Regular rather than massive treatment is needed for this type of case.

The Medical Journal of Australia

SATURDAY, AUGUST 15, 1936.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

THE SEVENTH AUSTRALIAN CANCER CONFERENCE.

ALMOST the whole of this issue is devoted to a report of the seventh Australian Cancer Conference that was held in Melbourne from May 4 to 8, 1936. This session was different from any of its predecessors in several respects — it was the first session to be held outside Canberra, many of the papers were purely clinical and, in addition, clinical, operative, radiological and laboratory demonstrations were held. At several previous sessions delegates from more than one body had clamoured for a change of venue from Canberra to a capital city of one of the States. The seventh conference was thus in some respects an experiment. To some extent the experiment was justified, but it was perhaps inevitable that a gain in one direction brought with it a loss in another. The introduction of practical demonstrations and a preponderance of clinical papers attracted some practising members of the medical profession who might not have been so interested had the programme been planned on exactly the same lines as previous conferences. This was important chiefly on account of the discussion that dealt with the provision of diagnostic and treatment facilities in country centres. It was hoped also that medical practitioners would recognize the purpose and value of cancer conferences. Many of those who came to hear the clinical papers, however, did not attend the short discussion on recent developments in radiological physics—they did not show that they were anxious to study the treatment of cancer from all its points of view. The physicists put the medical practitioners to shame, for almost to a man they attended meetings at which clinical papers were read. Admittedly the seventh conference was more clinical than academic and may not have been so useful to experts in cancer treatment as previous conferences were. The members of the seventh conference have determined that the next conference is to be held at Canberra, and in these circumstances the proper balance between clinical and scientific papers will probably be restored. Whatever happens, it is to be hoped that the purely scientific will never be relegated to a subordinate or sectional rôle, but that the conference will continue to meet as one body. If surgeons and radiotherapists are to achieve worthwhile results, they must, when opportunity presents itself, try to understand the rationale of all methods of treatment, to recognize the limitations imposed by each method, and to appreciate the success of methods other than their own.

The discussion on the provision of diagnostic and treatment facilities in country centres left no doubt in the minds of those present that some organization was necessary to enable the general practitioner in extra-metropolitan areas to deal according to its needs with every case of cancer that he sees. The problem, though not simple, can be solved. Already useful efforts are being made in several places. In Adelaide the general practitioner receives from the radiotherapy clinic at the Adelaide Hospital circulars containing summaries of recent work in cancer of different parts of the body. In Queensland attempts at decentralization have been made. Subcentres have been established at Rockhampton, Mackay, Townsville and Cairns, and have been provided with supplies of radium and radon. Officers from the Queensland Cancer Trust pay

periodical visits to these subcentres to give advice to the practitioners in the district and occasionally to lecture to the general public. Most important perhaps is that the Queensland Government has shown a genuine desire to be of assistance, for in association with the Queensland Cancer Trust it makes itself responsible for the expenses of patients who have to travel to a large centre for treatment and who cannot afford to pay their own way. Several of the speakers at the discussion suggested that trained experts should visit or reside in provincial centres, and one speaker suggested that more links might be forged in the chain of laboratories under the control of the Commonwealth Department of Health. We have no doubt that the committee which has been appointed to report on the whole matter to the next Cancer Conference will take note of what has already been done, and in its recommendations will make full use of existing machinery and personnel. In any scheme government help will be required and the general practitioner will necessarily take a prominent part.

That the Commonwealth Government is not unmindful of the common weal is shown by the recent announcement in the daily Press that a Medical Research Council is to be established on the lines of the resolution adopted by the seventh Cancer Conference. The full text of the resolution is to be found in our report on page 243 of this issue. The promise made by Dr. Earle Page at the 103rd annual meeting of the British Medical Association last September is to be honoured. The new council will be representative of the whole Commonwealth and will unite the States in a common enterprise.

Non-medical people and even medical practitioners sometimes ask what cancer conferences are for and what good they do. In the report of the seventh conference this question is answered. The cause of cancer is not known, but good use is being made of what knowledge is available. At the recent conference the general practitioner was given an opportunity of voicing his opinions, and a serious attempt will be made to help him in his everyday fight against cancer. Knowledge of radium and of X radiation is being extended. Medical research in Australia is to be put on an organized basis. The future is full of hope, and we must regard the seventh Cancer Conference as being, within its set limits, a useful and successful gathering.

Current Comment.

THE MECHANICS OF BREATHING IN RELATION TO DYSPNŒA.

THE great advances made in biochemical knowledge during the last few decades have to some extent tended to obscure the other sides of certain physiological problems. A case in point is the study of dyspnœa in diseases of the heart and lungs. Here detailed investigation of the physical chemistry of the blood, with particular reference to its acid-base equilibrium and to its oxygenation, have yielded most useful information, but perhaps our zeal in this direction has rather caused us to forget the mechanical factors in breathing. A. Cournand, H. J. Brock, I. Rappaport and D. W. Richards have carried out a series of careful measurements of several patients with pulmonary fibrosis and have paid particular attention to the relation of the respiratory function to the framework of the chest.[1] The patient who was the central figure of this study was a man, aged forty-five years, who suffered from an extreme degree of physical disability due to dyspnœa. No relevant abnormalities could be detected in the aeration of the blood or the capacity of his circulation to provide transport for the blood gases, and his breathlessness was due to mechanical causes. It will be noted, however, that the electrocardiogram showed a slightly lowered voltage in the heart current. Attempts to measure the cardiac output were made, but these were not satisfactory. It is interesting to compare the findings of experiments on the lung capacity in this patient with other controls. His reserve air was 689 cubic centimetres, that of a normal person was 2,100, though the tidal air was little reduced; his vital capacity was only 2·42 litres, as against 5·02 litres for the normal subject. However, analysis of the composition of arterial blood in the dyspnœic subject showed that aeration was accomplished in the lungs in a normal fashion. Examination of the patient's chest revealed an asthenic type of thorax with the upper part permanently elevated. Some kyphosis of the upper dorsal vertebræ was noted, and the ribs were more horizontal than is usual, leaving wide intercostal spaces. The diaphragm leaflets were seen on the X ray screen to be low and somewhat flattened. Inspection of the act of breathing showed a most exaggerated effort on the part of the muscles controlling the upper portion of the chest; the sternomastoid and scalene muscles were obviously firmly

[1] *Archives of Internal Medicine*, May, 1936.

contracted, even during quiet respiration, and the shoulders moved bodily upwards. There was little lateral expansion of the lower ribs, and the abdomen protruded when the subject was in both the upright and supine positions. A most interesting point was that the contraction of the upper respiratory muscles preceded the lower costal and diaphragmatic movements and thus failed to synchronize with them. In this subject normal quiet breathing was really a hyperventilation chiefly of the upper costal type, with evidence of mechanical resistance to both inspiration and expiration, and only during voluntary deep breathing were the lower muscles brought properly into play. It is significant that this patient was considerably improved with no other treatment than the training involved in the performing of many exercise and respiration experiments. This is a most important point. Anyone reading this article cannot fail to be impressed by the great detail with which the experimental work was carried out on this subject, but perhaps even more impressive is the most valuable information the authors gained by merely looking at their patient with trained and observant eyes.

They deal further with the question of the subjective sensation of dyspnœa and point out that it is presumably conveyed by proprioceptive impulses received from the framework of the chest and from the lungs. The principle is laid down that "dyspnœa is a sensation appearing whenever the mechanical apparatus for respiration is unable to provide easily the ventilation required by the person's immediate metabolic state, but that dyspnœa is essentially unrelated to the metabolic state as such". The question is also asked if the whole response of the clinical state of breathlessness may not be a purely functional one, or indeed a form of neurosis. The bearing of the psychological background to the subjective sensation of dyspnœa is, of course, familiar to clinicians, but we must agree with the authors that this is of secondary importance in cases such as they describe. The relation to athletic training of these and similar observations on respiration will also occur to the mind, and this brings us back to the possibility of affording considerable relief to such patients by employing the methods of muscular reeducation. The value of these in asthma is already well known, and they might receive more extended recognition. But most important of all is the realization that accurate observation of the dyspnœic patient is a fruitful clinical method. Let us remember that physicians were able to recognize physical disabilities in thoracic disease before the days of Röntgen, Laennec or Auenbrugger.

THE ŒSTRIN TREATMENT OF CYSTIC DISEASE OF THE BREAST.

RECENT years have seen great advance in the hormonal treatment of many conditions, and breast conditions are among those in which good results have been obtained. E. Dahl-Iversen, Professor of Surgery in the University of Copenhagen, in a short communication[1] states that he has during 1935 treated 22 cases of cystic mastopathia with œstrin and has obtained "considerable recovery" (an unusual phrase) in 18. He advises a dosage of 2,000 to 4,000 mouse units daily by mouth and 10,000 to 20,000 once a week given intragluteally. The course of treatment should last three to six months, and in some cases should be continued longer, with pauses. In two of his twenty-two patients, both between twenty and thirty years of age, the local and general condition was aggravated; in two cases there was no effect. The aggravation in the two cases referred to resembled that sometimes seen in patients in the middle forties, when, it is presumed, the patient is already suffering from a relative excess of œstrin. Dahl-Iversen states that the treatment seems specially applicable to cystic mastopathia in young women in the hope of avoiding operation. In older women, if conservative treatment does not help, he has less disinclination to operate. In any case, be the patient young or old, conservative treatment demands the most close and continuous supervision. Dahl-Iversen gives the history of the treatment of a woman of forty-nine who was treated conservatively. Perusal of this history leads to the conclusion that the diagnosis must be certain before conservative treatment is adopted.

A MEMORIAL TO BARRY COTTER.

AN interesting ceremony, which should not be allowed to pass unnoted, took place at Swan Hill, Victoria, on June 20, 1936, when a tablet in memory of the late Barry Cotter was unveiled by Dr. Felix Meyer. The ceremony formed part of the centenary celebrations at Swan Hill, where Cotter died in 1877. He came to Melbourne with John Batman, the founder of Melbourne, in 1835, and was Melbourne's first medical practitioner. His story has been told by Dr. G. T. Howard in THE MEDICAL JOURNAL OF AUSTRALIA of March 17, 1934, at page 364. The inscription on the tablet in the Town Hall, Swan Hill, is as follows:

Erected to the memory
of Barry Cotter, L.F.P.S.G.
Melbourne's First Doctor.
Born in Ireland 1809.
Arrived in Melbourne with John Batman, 1835.
Died at Swan Hill 1877.

This tablet was erected by the resident medical practitioners of Swan Hill in this centenary year of the town, and unveiled by Dr. Felix Meyer, 20th June, 1936.

Dr. Meyer had with him on this occasion Dr. Alan Mackay and two grandchildren of Barry Cotter. Dr. Meyer complimented the medical practitioners of Swan Hill on having taken the initiative in perpetuating Barry Cotter's memory, and announced that the Victorian Branch of the British Medical Association would follow their example.

[1] *The Lancet*, June 6, 1936.

Abstracts from Current Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Hydrogen Ion Concentration in the Cultivation of Entamœba Histolytica.

GLADYS M. CRAIG (*The American Journal of Hygiene*, January, 1936) reviews the literature dealing with the effect of pH on the growth of *Entamœba histolytica* and reports the results of an investigation undertaken to determine the relation of pH to growth of the amœbæ in a medium buffered to prevent the rapid change in pH ordinarily observed in such cultures. A strain of *Entamœba histolytica* was grown in culture medium with a 1 to 10 serum-saline solution dilution. The medium was made as follows: Difco Bacto liver infusion agar, 30 grammes; dibasic sodium phosphate, 3 grammes; distilled water to one litre. The medium was tubed, sterilized and sloped. The reaction after sterilization was 7·2. In checking the pH of cultures after incubation the supernatant serum-saline was poured out and passed through a Seitz filter and the reaction of the filtrate determined. Buffer solutions were prepared by making an N/15 solution of Sorenson's KH_2PO_4 and Na_2HPO_4 in physiological salt solution. In the buffered medium, after twenty-four hours' incubation a drop of a culture showed very numerous active amœbæ and numerous cysts. During seven months' observation this strain of amœbæ had not been known to produce cysts in unbuffered medium. At the end of twenty-four hours' incubation the pH of buffered medium had dropped from 7·4 to 7·0; in the unbuffered medium the drop was from 8·6 to 6·6. Cross-inoculations from buffered to unbuffered and from unbuffered to buffered were made and in every instance growth in buffered was much greater than in the unbuffered medium. An initial pH of 7·4 to 7·6 was found to be most favourable.

Staphylococcal Anatoxin and its Use in Staphylococcal Infections.

G. RAMON, A. BOCAGE, P. MERCIER AND R. RICHON (*La Presse Médicale*, February 1, 1936) record their observations on the use of staphylococcal anatoxin in staphylococcal infections. The anatoxin is prepared by growing staphylococci in broth and treating the resulting filtrate with formalin and moderate heating. The anatoxin is tested for toxicity *in vivo* and *in vitro* and also for antigenic content, which is expressed as antigen units. In the first instance staphylococcal anatoxin was used in the treatment of such conditions as furunculosis, sycosis and pustular acne. Three subcutaneous injections of 0·5, 1·0 and 1·0 cubic centimetre were given at weekly intervals. These amounts were usually sufficient, but occasionally one or more further injections were required. In hypersensitive persons the initial dose was sometimes reduced to 0·25 or even to 0·1 cubic centimetre. Local reactions are represented by a sensation of heat at the site of inoculation, followed by a small area of redness, which rapidly fades. Focal reactions are evidenced in a transitory congestion of the lesions and acceleration in maturation. Instead of taking ten to fifteen days to develop, many take only forty-eight hours. General reactions vary; at times they are absent, at others there is mild pyrexia, and in a few exceptional cases the general reaction is more severe. In four patients, three of whom were children, vomiting and diarrhœa occurred. Of 200 new patients with furunculosis treated by anatoxin, 131 were cured or benefited. Those cases which were most resistant or in which recurrence was most likely to take place were cases of hyperglycæmia, but in the majority further injections cured the relapse. The authors have used staphylococcal anatoxin in osteomyelitis and septicæmia. In the former the results obtained are regarded as encouraging; in the latter too few cases have been observed to enable an opinion to be offered, but further cases are being investigated.

Leucoerythroblastic Anæmia.

JANET M. VAUGHAN (*The Journal of Pathology and Bacteriology*, May, 1936) has made a study of leucoerythroblastic anæmia. Two series of cases were investigated; in one there was a proven blood picture of this type of anæmia; the other comprised clinical conditions in which this blood picture might reasonably be expected to occur. The essential feature of the anæmia is the presence in the circulating blood of extremely immature red cells and of some immature granular white cells without necessarily a severe degree of anæmia. Thirteen patients with leucoerythroblastic anæmia had red counts varying from 2,200,000 to 5,300,000 per cubic millimetre, reticulocyte counts varying from 2·5% to 15·3%, nucleated red cell counts from 1 to 106 per 200 white cells counted, the average being 36. These cells ranged from primitive hæmocytoblasts to ripe normoblasts with pyknotic nuclei. The white cell counts varied from 3,100 to 17,500 per cubic millimetre, the immature myelocytes from 7% and 0·5%, and proleucocytes from 5% and 0·5%. The underlying condition in this series was carcinomatosis in eight cases, myelomatosis in one case, Cooley's anæmia in one case, and myelosclerosis in three cases. In the second group there were 55 cases of carcinoma; in 24 of these metastases had occurred in bone and leucoerythroblastic anæmia was found in 8 of the 24. Autopsy was performed in seven cases; the long bones were found to contain an excess of red marrow, the excess not being influenced by the amount of bone involvement by the tumour. The histological picture was of the osteoclastic type. Three patients with myelosclerosis were examined. This condition is defined as an osteodystrophy characterized by an excess of bone in the spongiosa and medulla, with no alteration of the corticalis, no alteration of external form and no tendency to fracture. All the patients had increased calcium excretion and all showed typical leucoerythroblastic anæmia. Autopsy in one of the cases revealed excess of red marrow. A case of Cooley's anæmia appeared in the series; there was a typical blood picture, although the patient was not of Mediterranean stock. The literature of Albers-Schönberg's disease presented ten cases with leucoerythroblastic anæmia. There is no evidence that increased blood destruction, loss of blood or mechanical blocking of the marrow operates in the ætiology, the anæmia being characterized by its immaturity rather than by its severity. The marrow appearances and the cytology of the peripheral blood have many features in common with Addisonian anæmia, but the condition is not found in the absence of bone changes, although the bone changes may be found without the anæmia. It is suggested that leucoerythroblastic anæmia is caused by deficiency of a factor or factors necessary for normal hæmopoiesis.

Culture of Tubercle Bacilli.

A COMPARATIVE study of the advantages of six different culture media inoculated with sputum has been undertaken by S. Russell Jamieson (*The Journal of Pathology and Bacteriology*, March, 1936). Sputum was treated with an equal volume of 6% sulphuric acid, centrifuged and inoculated onto two bottles of each of six media. Microscopic examination was made at the same time. The microscopic test gave a positive result in 92 of 100 cases; culture on Petragnani's medium gave 100% positive results; on Löwenstein's medium the percentage was 100; on Herrold's medium it was 96; on the medium of Corper and Uyei it was 89; while the media of Petroff and of Sweaney and Evanoff produced a positive result in 77% and 75% only. Petragnani's medium was superior in rate of growth also, visible colonies appearing in all within four weeks, while 95% only showed in this time on Löwenstein's medium. The medium of Petragnani is cheap, easy to prepare, and contamination of the medium was rare in the cultures.

The Size of Virus Particles.

W. J. ELFORD, C. H. ANDREWES AND F. T. TANG (*The British Journal of Experimental Pathology*, February, 1936), using the ultra-filtration method, have continued their studies on the size of virus particles. After filtration through a membrane of selected average pore diameter, the filtrate was inoculated intranasally into mice in doses of 0·05 cubic centimetre. All mice surviving after five

days were killed and their lungs were examined for the typical lesion. It was found that an average pore diameter of 0·14μ completely retained the virus, while one of 0·18μ allowed a little to pass. The end point of the titration was thus taken to be 0·16μ. The virus of human influenza and the virus of swine influenza were tested and found to give almost identical results. The experiments amplify the previous finding that the diameter is less than 0·3μ, and render it improbable that the virus particles can represent a small form of the hæmophilic bacilli "or of any other bacterium which has been suggested as a cause of influenza".

HYGIENE.

Leprosy in the Philippine Islands.

GEORGE C. DUNHAM (*American Journal of Public Health*, January, 1936) gives an abstract of the report of the Philippine Islands Leprosy Commission appointed following on a veto by the Governor-General of a bill passed in 1935 to permit "positive" lepers being treated in their own homes by private physicians and their release after a short "negative" period. Culion Leper Colony, which is remote from centres of population, deals with 7,000 out of 8,700 segregated lepers. About 300 a year are liberated on parole after becoming "negative", and about 50% of these relapse. Among the conclusions of the commission the segregation of bacteriologically positive lepers is upheld as the basis of control. Segregation in the house is considered impracticable in the Philippines. Group segregation of "positives" is the method of choice as giving the best environment to the leper and the best protection to the public. Regional colonies and regional treatment stations with leper hospitals for advanced cases are recommended, together with regional agricultural colonies. The basic preparole observation is reduced to six months in place of twelve, but must provide for adequate following up and proper observation and treatment. Adults may be regarded as practically immune, but children are especially susceptible. Children of leprous parents should be separated at birth (not after six months, as previously) and placed with non-leper relatives or in institutions.

Epidemiology of Malaria in the Philippines.

PAUL F. RUSSELL (*American Journal of Public Health*, January, 1936), in a review of Philippine experience in malaria, states that in a population of 13,000,000, 2,000,000 suffer from malaria every year and 10,000 or more die. In the provinces parasite indices of 11% and a spleen index of 18·8% have been recorded. Although 28 species of *Anopheles* occur in the Philippines, only *Anopheles minimus* var. *flavirostris* is an undoubted human carrier. *Anopheles minimus* bites quietly at night, leaving little or no mark. Its effective range is over one kilometre. It prefers small streams and flowing irrigation ditches. Clean, fresh, flowing, slightly shaded water is preferred, especially if bamboo roots are available for shelter. It occurs only occasionally in pools and wells, and never in brackish or seawater or in rice fields, nor above 2,000 feet altitude. *Anopheles maculatus* can carry the parasite, but prefers biting cattle. Hence malaria is endemic in the foothills and the coastal swamps; flat plains and high plateaus are not malarious. Hence pools and tin cans, stagnancies, rice fields and jungle, together with quinine prophylaxis and gambusia fish, are beside the mark. Mosquito nets, Paris green, species control and concentration only on carrier mosquitoes have given good results. This author is pessimistic about the possibility of rural control on grounds of expense; economic methods have yet to be fully developed. Biological methods hold out most hope. In cities, organized industrial and agricultural centres, military camps, prisons, prosperous rural towns, control is entirely feasible. Time more than money, continuity rather that perfection, should be the guiding maxims. "We do not yet know how to control malaria in much of the rural tropics at a cost the people can bear."

Poliomyelitis.

J. CRAIGIE (*Canadian Public Health Journal*, January, 1936), in a review of the poliomyelitis problem, states that the virus travels along the olfactory nerve sheaths and that 80% becomes confined to the central nervous system. The naso-pharynx is also infected, but neither the blood nor the cerebro-spinal fluid. When the person survives, the serum develops an antibody neutralizing virus. Immunity may develop without disease and does not entirely depend on the antigen. Tissue culture methods suggest a humoral, not cellular, type of immunity, as also does the development of immunity in monkeys after intradermal but not after subinfective intracerebral injection of virus. The author suggests that, like vaccine virus, it has, in addition to an antigen which survives inactivation of the virus, a hyperlabile antigen which disappears during this inactivation, the former developing an antigen which neutralizes the virus outside, but not inside the body. The frequency of subclinical immunity argues against strict neurotropism. Like that of yellow fever, the virus of poliomyelitis may show a dual tissue affinity, both neurotropic and viscerotropic, invading the body through the respiratory mucous membrane. This nasal mucosa may form a non-specific barrier to invasion of the central nervous system and centripetal axonal propagation of the virus. Immune serum proved a failure at Los Angeles, 59% of those treated developing the disease. The use of inactivated virus for active immunization is difficult to test; from 10,000 to 15,000 need vaccination to protect 100 susceptibles, but the risk is definite. The possibilities of enhancing the barrier formed by the nasal mucosa are worthy of investigation.

Chronic Endemic Dental Fluorosis.

H. T. DEAN AND E. ELVOVE (*American Journal of Public Health*, Volume XXVI, Number 6, 1936) state that mottled enamel, an endemic hypoplasia of permanent teeth, has been recorded in 300 areas of 23 States in America. The incidence is high, often 90%. The cause is the ingestion of fluoride in water supplies in amounts exceeding one part per million during the age period of tooth formation, chiefly the first ten years of life. The skeleton may also be affected. In high concentrations gingivitis is noted. Similar hypoplasia has been noted in domestic animals. The teeth themselves are not more liable to caries, but a permanent unsightly physical defect results. The authors set out standards for sampling: a careful testing of all water sources, the fluoride content being estimated colorimetrically, zirconiumalizarin being used and a full chemical analysis of the water completed. The percentage distribution of severity allows of the computation of a mottled enamel index, which is correlated with the fluoride content of the water supply averaging twelve consecutive monthly figures.

Protamine Insulin.

R. B. KERR, C. H. BEST, W. R. CAMPBELL AND A. A. FLETCHER (*Canadian Public Health Journal*, Volume XXVII, Number 4, 1936), writing on protamine insulin, state that a satisfactory source of protamine is the sperm of the British Columbia salmon. Protamine buffered with sodium phosphate is added to insulin and the fine flocculent precipitate is used for injection. It should be used within ten days. One dose daily has proved adequate on test animals. Glycosuria is less for the same number of insulin units and a very large dose of protamine insulin keeps blood sugar low for thirty hours without hypoglycæmic reactions. Hepatic glycogenolysis due to epinephrine *et cetera* is sufficient to neutralize the effects produced by insulin during its slow liberation. The authors confirm Scott and Fisher's finding that the addition of zinc to insulin or to protamine insulin results in prolonged action. Efforts are being made to make available late this year a uniform, well standardized protamine preparation of insulin. In twenty-five cases the authors confirm the findings of Hagedorn and his coworkers—the curve of blood sugar reduction is two or three times as long as with insulin. Ketosis is less, well-being greater. Hypoglycæmic reductions are fewer in severe, juvenile and unstable patients. A dose of regular insulin in the morning and of protamine insulin in the evening has been favoured.

Public Health.

SEVENTH AUSTRALIAN CANCER CONFERENCE.

THE seventh Australian Cancer Conference was held at the Royal Australasian College of Surgeons, Spring Street, Melbourne, on May 4 to 8, 1936. Dr. J. H. L. Cumpston, Director-General of Health, Commonwealth Department of Health, occupied the chair. Delegates from every State of the Commonwealth and from New Zealand were present.

The following bodies were represented: The Commonwealth Department of Health and Commonwealth X Ray and Radium Laboratory, the Federal Council of the British Medical Association in Australia, the Royal Australasian College of Surgeons, the Australian and New Zealand Association of Radiology, the Commonwealth Council for Scientific and Industrial Research, the New Zealand Branch of the British Empire Cancer Campaign Society, the Department of Health of Victoria, the Department of Health of Queensland, the Department of Health of Western Australia, the University of Sydney, the University of Melbourne, the University of Queensland, the University of Adelaide, the University of Western Australia, the University of Sydney Cancer Research Committee, the Queensland Cancer Trust, the General Committee of the Anti-Cancer Campaign of South Australia, the Perth Hospital Cancer Trust, the Tasmanian Anti-Cancer Campaign, the Victorian Branch of the British Medical Association, the Queensland Branch of the British Medical Association, the Committee for the Study and Treatment of Cancer (Sydney), the Walter and Eliza Hall Institute of Research, the Victorian Permanent Post-Graduate Committee, the New South Wales Post-Graduate Committee in Medicine, the Brisbane and South Coast Hospitals Board, the Radium Committee of the Brisbane General Hospital, Saint Vincent's Hospital (Sydney), Newcastle Hospital, the Royal Melbourne Hospital, the Austin Hospital (Heidelberg, Victoria), Saint Vincent's Hospital (Melbourne), the Perth Public Hospital, the Hobart Public Hospital, the Launceston Public Hospital.

The Official Opening.

THE RIGHT HONOURABLE W. M. HUGHES, Minister for Health of the Commonwealth, who was to have declared the conference open, had met with an accident and was unable to be present. He sent an apology and an address which was read by Dr. Cumpston.

In the course of his address Mr. Hughes said that if science was to triumph over the scourge of cancer it would be only by wise planning and coordinated effort. The first thing necessary was research, and for this purpose there was needed an Australian Research Council, backed by all governments, Federal and State, and by the public. While research was proceeding the disease had to be treated. The course of action that should be taken was mainly along the lines indicated by Dr. McKillop in his report. A sustained and well-directed publicity campaign was also needed. The body responsible for the campaign should be able to do things as well as to talk about them, and action was impossible if they entertained the suggestion that all interests should be represented. The committee responsible for such a campaign should be small. The first thing to banish from the lay mind was fear. The medical profession had a message of hope for the sufferer, of warning and advice to the community, and that message it ought to deliver. Mr. Hughes then discussed the mortality rates from cancer. He said that people had been led to believe that the death rate from cancer was increasing. An analysis of figures supplied by the Federal Statistician showed that there had been no increase since 1910 in the cancer mortality rate for males and females under thirty years of age. There had also been no increase in the cancer mortality rates of males and females between the ages of thirty and sixty years, but there had been an increase from 6·69 to 8·08 in the mortality rates from cancer of males aged sixty years and over; as in the previous groups, however, there had been no increase for females in the higher age groups. It was necessary to consider the increased proportion which those persons of seventy years of age and over now bore to the total population. The increase in the number of people aged seventy years and over in the community corresponded with the increase which had taken place for the average population. In these circumstances the problem of cancer took on a less sombre hue. Medical science was not fighting a losing battle; at the worst it was holding its own. Mr. Hughes thought that a vigorous campaign urging the need for early examination and the education of the public how to avoid precancerous conditions would turn the tide of battle. In this great campaign the Commonwealth Government was prepared to cooperate.

Sir Hugh Devine, in the absence of Dr. R. B. Wade, President of the Royal Australasian College of Surgeons, welcomed the conference to the College buildings and expressed the pleasure of the Council of the College at its association with the Commonwealth Department of Health in the fight against cancer.

Sir Henry Newland, in speaking on behalf of the Federal Council of the British Medical Association in Australia, urged the formation of a Medical Research Council.

Chairman's Address.

DR. J. H. L. CUMPSTON began his address by thanking the Royal Australasian College of Surgeons for having placed its building and services at the disposal of the conference. He extended a welcome to the delegates from the several States and from New Zealand.

He then dealt first with the important question whether cancer as a disease was increasing in the community; whether this enemy of mankind was, so to speak, calling up fresh reserves so that they had to fight an enemy of increasing strength. Dr. Cumpston would show that this was not so, and for this purpose he would use some statistical graphs.

All present would be familiar with the simple statistical principle that the number of deaths from any disease in a community was not a true index of the prevalence of that disease, but that it was necessary to express the numbers of deaths in proportion to the number of the population concerned; this was the simple quantity, the death rate per hundred thousand of the population.

They would note first that the population of Australia had increased not altogether uniformly, but with certain spasmodic accessions. The three notable periods of great increase were the decades 1850-1860, 1880-1890 and 1908-1914. These great increases of population by immigration had been followed by great increases in the birth rate, and this in turn had resulted in changes in the age composition of the population, the numbers of young people gradually declining while the numbers of old people had gradually increased, until at the census of 1933 the proportion of the population at all ages above thirty-five years was considerably in excess of the standard European population. This meant, of course, that the number of people at the cancer ages was in Australia disproportionately large and the death rate for the whole population had within recent years steadily increased. But if they would examine the graphs they would see that the cancer death rate had remained at a uniform level for each age period up to sixty-five years. After sixty-five the death rate from cancer had increased, but there was an explanation for this. They would see from the figures that, at least since 1911, the death rates from "senility" had very noticeably fallen, and this was especially true of all ages over sixty-five.

SENILITY.

Death Rates in Age Groups Above Age Sixty Years.

Age Groups.	1911.	1921.	1933.
60-64 years	1·070	0·288	0·017
65-69 years	3·853	1·915	0·702
70-74 years	13·075	9·780	3·514
75-79 years	30·004	20·332	10·260
80-84 years	63·465	52·571	29·197
85 years and over	145·815	117·318	67·235

There could be little doubt that these two statistical facts taken together meant that medical men in certifying deaths had now ceased to use the term "senility" as a cause of death, substituting the more correct diagnosis of cancer. Clearly this would mean an increase in the cancer death rates at the age of "senility", namely, sixty-five years and over, while it did not imply an actual increase in cancer.

They might therefore conclude quite reasonably that there had been no actual increase in cancer during the last thirty years. But it was equally true that an increasing number of people were dying of cancer, the reason being that an increasing number of people in the community were reaching the cancer age, so that the statistical proof provided no satisfaction for the individual who was within or approaching the cancer ages. It could not be thought that any member of the medical profession, knowing, as each did know, that he individually was possibly faced with this fate, would remain quiescent or apathetic upon any aspect of this grave problem.

It might be that they as a profession were not doing all that might be done, and it was the object of the conference to review the position from year to year, to record progress, to recognize obstacles and to take stock of resources that they might, as rapidly as possible, adopt or adapt any instrument which offered prospect of greater success.

There had not been at any time in medical history such a mobilization of talent and resources in the search for the cause of any disease; there had not been such anxious thought and study towards the cure of any disease as there had been in the case of cancer; and in Australia they might claim to have been no less active than the workers in other countries. If they had given more thought to treatment and cure than to research, that was no cause for reproach, but perhaps was the method best adapted to Australian conditions. But it could not even be said that they had been idle in respect of research, for many able and devoted men had spent their time during the last seven years in research into this disease in Australia.

They had had the great advantage of frequent visits to other countries by Australian leaders in this field; they had had reports presented to these conferences by Dr. Moran, Dr. Sandes and Dr. McKillop, and Dr. McKillop's exhaustive report would be fully discussed at a later session of the conference.

This was hardly the time for a discussion of the technical aspects covered in these reports, but some of the aspects raised by these able reporters Dr. Cumpston would briefly mention.

Dr. McKillop recommended that they should adopt the strict suppression by legislation of all forms of quackery in regard to cancer diagnosis and treatment. This question of treatment by unqualified persons, usually referred to as "quacks" or "charlatans", was not without difficulties of a fundamental kind. The whole subject had been closely reviewed in an official report from the Health Organization of the League of Nations in 1935 by Dr. Wasserberg, who expressed his conviction "that there is no coping with charlatans by prohibitive legislation and that the confidence of the lay public in the doctor will be gained and consolidated by the positive results of the doctor's treatment".

They need not examine the fundamental human impulses which created and nurtured the great body of ignorant and unscrupulous persons who thrived on the credulity or the despair of the sick. The greatest obstacle to effective action against them was the faith in them and confidence given to them by some of the most responsible and most educated persons in the community. There was an element of ironical humour in any attempt to protect such highly intelligent people against themselves.

But the medical profession worked under the disadvantage of being honest and of admitting its limitations; the vendor of health had no such inhibitions. An official German report published in 1934 stated that:

> There has been among lay healers, a great increase in the popularity of so-called "de-radiation" appliances, which are built in under dwelling houses and cattle sheds and are suppposed to protect man and beast against the effects of the allegedly highly dangerous telluric rays and the diseases they cause, especially cancer.

They could think, almost with envy, how easy it would be to sell those machines, while, on the contrary, they did not feel able to say positively with that scientific honesty which they held as almost sacred that these telluric rays did not produce cancer. They knew of a certainty that they had no such relation, but they had no definite negative proof.

The "charlatan" had no knowledge, had no inhibitions, admitted no decent restraints upon his conduct, had in fact no conscience. It was the pride of the medical profession that in its dealings with patients its members were at all times scrupulously honest. In dealing with a disease like cancer this honesty was especially called into action.

Dr. Cumpston believed that it was possible, and in the interests of justice and humanity necessary, that legislation for the suppression of unqualified practice should be instituted. In dealing with cancer the cruelty of this unqualified practice was every day emphasized. And if people turned to such exploiters in their hopelessness, what hope could they as a profession offer?

They could beyond doubt show that the prospect for the cancer sufferer today was very much better than it had been twenty or even ten years ago. The art of surgery in this field had, with greater knowledge and experience, been greatly improved; the use of X rays and radium had altered the outlook infinitely for the better in many forms of cancer. Dr. Cumpston would not endeavour to support these statements with statistics, but these could be furnished—they were matters of common knowledge within the profession and should be accepted.

Research into the cause of cancer was steadily proceeding. It would not perhaps convey much to some members of the gathering if he were to tell them that, by feeding rats on a diet in which certain essential ingredients were absent, and to which certain irritating substances had been added, cancer could be produced in the stomach of rats, or that by applying a chemical substance known as 1-2-5-6-dibenzanthracene cancer of the skin could be produced in rats; but at least it would be appreciated by everybody that an important first step in the investigation of any disease was the ability to produce that disease at will. Research was steadily proceeding, a great army of workers was now engaged, and they must look ultimately for success. It was an arresting and important fact that the chemical substances known to produce cancer artificially were closely related chemically to the normal secretions of the body.

Gye, the Director of the Imperial Cancer Research Fund in England, had stated:

> It can be said without fear of contradiction that the knowledge of the disease gained during the last thirty years is more extensive than that of most other chronic diseases and has profoundly influenced its diagnosis and treatment. Cancer has ceased to be an unaccountable mystery, and we need no longer fear that its solution surpasses the wit of man.

But while this success was being awaited, they had a task ready to hand: that of doing everything that was possible for the treatment of those affected with this disease.

One of the greatest living authorities on the treatment of cancer, Professor Gösta Forssell, of Stockholm, had expressed the position in the following way:

> One of the most important tasks in the campaign against cancer is to encourage general medical research and to establish the necessary agencies for carrying on research dealing with the special problems of cancer. But the patient with cancer has no time to wait for the slow progress of science toward this end. While awaiting the discovery of this general medication all our efforts should be concentrated toward making the local therapeutic means which we possess, radiotherapy and surgery, as efficient as possible, and making them available for all patients with cancer . . . .

The fundamental requirement for the efficacious treatment of patients with cancer is well organized medical teaching of the early diagnosis and the treatment of cancer, as well as a more extensive popular knowledge of this disease.

A review of the situation gave them some confidence. Australian surgery had nothing to fear and had reason for nothing but pride in any comparison with the surgery of other countries. Radium was available in Australia to an extent adequate to the needs. The Commonwealth Government had made this possible. The Commonwealth Government and the universities of the various States had made possible the production of radon—the emanation from radium—in quantities and forms adequate for those methods of treatment in which it was used. The Commonwealth Government had just established in the University of Melbourne—a step authorized by the Right Honourable W. M. Hughes—a first class X ray laboratory for standardization and research which would be of the greatest value in this campaign. In these fields they were making good progress.

Already 17,000 persons had been treated with Commonwealth and other radium, and similar progress could be recorded in other directions, but as to the organization of hospital accommodation, it was not possible to have quite the same satisfaction. In Melbourne, for example, the principal hospitals had patients on waiting lists. These patients were obliged to wait for shorter or longer periods after their condition had been diagnosed before treatment was commenced. This delay could be overcome by better organization.

Dr. Cumpston felt that it was his imperative duty to emphasize the statement made by Professor Forssell, which he had just quoted, in which Forssell indicated as the fundamental requirement of this campaign, early diagnosis of the disease.

They knew the sad fact that a very large proportion of the cases coming for expert treatment were beyond those early stages in the disease which offered prospects of ultimate cure—the figures given by different authorities varied from 50% to 80%—and this obviously made the success of the campaign much more difficult. In a recent review conducted by the Commonwealth Department of Health it was found that 60% of patients with cancer of the tongue presented themselves for treatment at a stage too late for any prospects of successful treatment. This, in that form of cancer whose presence was most easily recognized, called for serious thought.

They had to extend their range of vision beyond the radium laboratory, beyond the hospital, to the home and the practitioner first consulted by the patient. There should be no delay on the part of the patient and there should be no delay on the part of the practitioner who was first consulted. The patient should be placed under optimum conditions immediately and the resources available for skilled treatment should be so developed and organized that the commencement of treatment might be automatic and immediate.

These were matters involving the education of the public, the further education of every medical man, and the close and intelligent organization of all central resources with presently the extension of these resources to other great centres of population. This was not a new story. Dr. Cumpston was not pointing out anything which was not already well known to the profession, and especially to those who had met annually in conference for the last seven years, but he was pointing out a direction in which much yet remained to be done, and this brought him to the question of organization.

Various suggestions had been made. Dr. Sandes had suggested a cancer commission; Dr. McKillop suggested in less definite terms that the Federal Government should take up cancer as a national problem, just as it had done in the case of maternal welfare. This last suggestion would be discussed by the conference, but each of these two authorities had suggested some form of Commonwealth organization.

How much the Commonwealth could actually do was a matter upon which, as yet, Dr. Cumpston had been unable to formulate any clear picture, but at least it was clear that the Commonwealth could hardly organize State hospital resources, or undertake a detailed scheme of post-graduate education, of consultation services, of popular education and other means of bridging the essential and recognized gaps in the present system. These were matters calling for local organization within each State; they called also for very intent and sympathetic organization within the profession. It was in recognition of these important aspects that they had placed in the first position on the programme the discussion, which would be held at the close of his address, on the practical steps for improving facilities in country centres and rural districts for the examination, diagnosis and selection of appropriate methods of treatment in cancer cases.

Dr. Cumpston might perhaps be permitted to extend this speculation as to organization into other fields. During the last twelve months it had been his lot to be associated with three great social problems: those concerning cripples, maternal mortality and cancer. In each of these the same elements had appeared: early diagnosis, greater knowledge of treatment and facility for placing difficult cases in expert hands without delay.

The public health machinery which the people of Australia had available was out of date, and while it was once a source of pride that they were at least marching in step with other countries, it had now to be admitted that they were falling behind in this phase of social work. It could not be said that Australian public health legislation and machinery were adequate to such problems as those he had mentioned, in which the work of the medical profession clearly had a social significance which should no longer be ignored in social organization.

While it was true of cancer and of these other public health problems that the power and the machinery were in the hands of the State authorities, he could nevertheless say from long experience that it had been proved that the Commonwealth could play an active and important part in all of these public health matters—a part which would become increasingly great as political and constitutional difficulties were overcome.

Perhaps, further, those present would allow him to touch upon another question—admittedly delicate. In their attempts to be honest with patients, they might carry in their individual relationships with those patients an expression of judicial impartiality which might produce an impression of helplessness, not so acceptable to the patient's condition in facing a grave crisis as might be a less judicial and more human attitude. Dr. Cumpston could not well speak of this without leaving himself open to undeserved criticism, but it was perhaps a matter worthy of further reflection. The cancer patient undoubtedly would prefer a human doctor to a cold judge. And, further, they were not perhaps as a profession well advised in their aloofness from those forms of public education which had come to be today the most powerful. The restrictions and limitations imposed by their Association upon public methods of expressing knowledge might with advantage be revised.

Dr. Cumpston concluded by saying that if he had not said anything new in his address, he could at least say with full conviction that today knowledge was greater than it ever had been, the prospects of dramatic success were brighter, and the hope which they could offer to any sufferer from cancer was infinitely greater than at any time in the past, but these prospects offered to the patient depended essentially and entirely upon early treatment.

Developments in Cancer Control in 1935.

A review of developments in connexion with cancer control in Australia during 1935, written by Dr. M. J. Holmes, Senior Medical Officer of the Commonwealth Department of Health, had been circulated prior to the meeting. The review was received. Dr. Holmes in his review discussed the subject under several headings, as follows: General Organization for Control of Cancer, Developments in Connexion with the Provision of Treatment Facilities, Operation of Clinics, Research, Radium, Educational. In summarizing his remarks Dr. Holmes pointed out that definite progress had been made in a number of directions and in relation to such details as the

provision of additional accommodation and equipment, the establishment or development of physical services, here and there some improvement in relation to pathological services, increased facilities in the training of undergraduates and in relation to post-graduate instruction, and so on. This progress was important in increasing the facilities for diagnosis and treatment and in insuring more accurate and effective application of treatment. Many of the wider problems, however, had not received the attention that their importance demanded. At the root of all efforts to apply the knowledge gained was the need for earlier diagnosis and earlier application of properly selected treatment. This necessitated more active education of the public and the closer linking up of the whole of the medical profession with the facilities made available for diagnosis, treatment and control of cancer.

The medical practitioner was, or should be, the most effective factor in establishing among the public a reasonable outlook on cancer which would recognize all the hopeful aspects and make for early seeking of advice in place of apathy, fear and concealment. Determined efforts should be made by every State organization to get the full support of the medical profession in this work and also to apply all other suitable means of assuring public interest and cooperation, not intermittently but continuously. This was not beyond the attainment of a suitably constructed permanent committee.

The fact that the problems of cancer were not confined to the metropolitan areas needed to be kept in mind, and such facilities as were practicable should be extended to rural districts. This was a matter which would receive the attention of the conference, and it was hoped that a practicable scheme would not only be adopted, but actively put into operation.

Within hospitals there was need for more complete coordination of departments; for closer cooperation of surgeons, radiologists, pathologists and others in consultative groups, to insure that the patient might receive without delay the benefits of the most appropriate method of treatment, which in many cases was a combined treatment, and that the condition of each patient might be reviewed from time to time in order to assess his or her response to treatment. As already indicated, many patients were lost to sight when transferred from a special branch, such as a radio-therapeutic department, to the general or surgical wards of the same hospital. There was need also for coordination between hospitals and for proper assessment of all treatment facilities, so that accommodation and equipment might be utilized to the best advantage and waiting lists reduced to vanishing point. The problem of the provision for the adequate treatment of the intermediate class of patient also awaited a practical solution.

These were all matters capable of being put upon a basis of effective practice. No additional knowledge was required. They were matters for determined attention by each State organization.

The holding of the present conference in close conjunction with the British Medical Association and the Royal Australasian College of Surgeons, the provision by the conference of ample facilities for general practitioners to take part in the conference, and to have demonstrated to them all the various activities which were being applied to the diagnosis, treatment and control of the disease and the throwing of the conference open to lay people, should do much to bring all together in the bonds of mutual assistance. The State organizations had the opportunity of welding this spirit of mutual assistance into a thoroughly effective weapon.

The Commonwealth X Ray and Radium Laboratory.

DR. C. E. EDDY had prepared a review of the activities of the Commonwealth X Ray and Radium Laboratories during the year 1935. The review, which had been circulated prior to the meeting, was received.

The most important section of the review was that dealing with new organization. It was pointed out that following upon resolutions of the sixth Australian Cancer Conference, relating to physical services essential to the scientifically accurate application of X rays and radium in the treatment of disease, the Commonwealth Department of Health had, in conjunction with the Council of the University of Melbourne, made arrangements for the expansion of the work of the Commonwealth Radium Laboratory to include activities in connexion with X ray therapy. The new laboratory was known as the Commonwealth X Ray and Radium Laboratory, University of Melbourne, and included the following amongst its objectives: (i) the setting up of primary standards in relation to the measurement of the international *r* unit of dosage and the determination of X ray quality; (ii) research and investigation into the physical problems and difficulties of X ray therapy in order to enable maximum scientific accuracy to be attained in the application of X rays to the treatment of disease; (iii) the encouragement of the establishment at the various radiotherapeutic centres in Australia of physical services in relation to radiotherapy; (iv) stabilization, standardization and improvement of radium and radon techniques.

The Commonwealth Department of Health had appointed the following staff, which entered upon its duties in August, 1935: Physicist-in-Charge of the Laboratory, Dr. C. E. Eddy; Physicist, Radium Branch, Mr. T. H. Oddie; Assistant Physicist, Mr. W. N. Christiansen; Mechanic, Radium Branch, Mr. G. E. Shera; Mechanic, X Ray Branch, Mr. C. Barnes. The experimental work of the laboratory would be carried out in close association with Professor T. H. Laby.

During 1935 a total of 29,033 millicuries of radon had been issued from the laboratory. Dr. Eddy pointed out that this was an increase of approximately 27% on the total issued during 1934. In 1930 the amount issued was only 11,830 millicuries. The number of radon containers issued for treatment purposes was 4,604; and 90% of the radon was issued in containers of at least 0·8 millimetre of platinum. During 1934 an arrangement had been made whereby limited quantities of radon could, if available, be supplied for use in private practice. The issue of radon was restricted to radiologists who had had considerable experience in the use of radon in public hospitals; a charge was made that varied according to the quantity used. During 1935 a total of 4,629 millicuries had been issued in this way. A total of 2,378 millicuries of radon had been issued during the year for research purposes to the Natural Philosophy Laboratory, University of Melbourne. Owing to the increased demand for radon, more radium had been placed in solution. There were at the time of the conference 1,578 milligrammes of radium element in solution.

Under the agreement entered into by the Commonwealth Department of Health and the University of Melbourne, the university was providing accommodation and facilities within the Natural Philosophy Laboratory. A large room of exceptional height had been provided; it would give office and workshop accommodation for the staff of the X Ray and Radium Laboratory and also the necessary laboratory accommodation for setting up standards of X ray dosage and quality and for carrying out X ray research. In addition, space was available for the installation of equipment operating at more than 500 kilovolts, and the question of equipment was being investigated abroad by Professor Laby.

At the sixth Cancer Conference it had been recommended that the Physicist-in-Charge of the laboratory was to make periodical visits to the several States and that he should be available for consultation on physical aspects both of X rays and radium. Visits had been paid to four of the States and the remaining two would be visited in the near future.

Dr. Eddy concluded his review with the statement that there was a unanimity of opinion throughout Australia that the provision of adequate local physical services in connexion with radiotherapeutic institutions was desirable, and definite steps were being taken in every State to extend the present facilities. The establishment of uniform services which would permit the calibration of each X ray beam used clinically in terms of surface and depth doses would surely result in much more definite information regarding the relative success of different radiation techniques, and could be regarded as a definite step in the research into the treatment of cancer.

Cancer Control in New Zealand in 1935.

A review of the developments in cancer control in New Zealand during 1935 was also circulated. In this review the organization of cancer control in New Zealand was described. The organization was carried out by the New Zealand Branch of the British Empire Cancer Campaign Society. Treatment was carried out in four centres. In some areas it had been necessary to provide further accommodation. There had been a growth in the mass of records, and it was found that the system of keeping records was not uniform in all centres. A medical man had been appointed to visit all the centres, with the result that the reports and records of the centres were uniform and comparable in every detail.

Reference was also made in the review to the work of Mr. J. A. Strong, Travis Physicist to the Society, at the base laboratory at Wellington Hospital, and to the inspections that he had made of the four centres. Further visits are to be made with the object of carrying out calibration work. Research work is being carried out by Dr. A. M. Begg, and during the period under review he was engaged in experimental work in relation to the rôle of the fibroblast in the genesis of cancer. The result of inoculating living cells and filtrates into muscle tissue and subcutaneous tissue had been investigated. The hope was expressed that in the field of statistical research there would shortly be a sufficient bulk of material available from the four centres to justify an investigation into the factors involved in the causation of cancer in New Zealand.

Diagnosis and Treatment in Country Centres.

A discussion was held on the practical steps for improving facilities in country centres and rural districts for examination, diagnosis and selection of appropriate methods of treatment in cancer cases. The chairman explained that arrangements had been made with the Victorian Branch of the British Medical Association that the discussion should be opened by speakers from country subdivisions.

DR. G. R. FELSTEAD said that he was glad to be able to express the views of country practitioners concerning facilities for early diagnosis and treatment of cancer. He disclaimed the ability to put forward any strikingly original suggestions as to these facilities. The subject had been so thoroughly discussed by Dr. Hone, and the needs of the country practitioner so clearly indicated, that there was little to add. Dr. Felstead wished, however, to stress certain aspects of the situation.

In the early diagnosis of cancer, as indeed in the early diagnosis of all diseases, there were three main avenues of approach: the clinical, the pathological (including biochemical), and the X ray; and the greatest of these was the clinical. Depending on the situation in the body of the organ under suspicion, the relative importance of the three methods varied; but in any case the clinical examination came first, both in time and importance.

It was well known that of the patients who consulted general practitioners, a relatively small proportion showed signs of a definite organic lesion. It was equally true that of those on whom fell the suspicion of cancer, a fairly large proportion could by careful clinical examination be classified as free from cancer or else placed in the category of those in need of more elaborate methods of diagnosis.

Pathological and X ray examinations were expensive and time-consuming, and it behoved medical practitioners, while being very ready to use them when occasion demanded, to be careful that they were not used indiscriminately. Careful clinical examination was the only means by which a programme of further special study could be made out, which would include all necessary investigation, but which would protect the patient from unnecessary procedures. In certain regions of the body, notably the breast, the clinical examination for cancer covered the whole ground of pre-operative diagnosis, for biopsy was precluded by the very nature of the disease. In the rectum also the clinical examination was pre-eminent; though in this site the snipping off of a piece of fungating tumour for pathological examination was not likely to cause spread of the disease and might be permitted. In other situations the tendency to cut short the clinical examination and to leave the diagnosis in the hands of the pathologist or radiologist was generally deplored and would reap its reward in a large percentage of failures. All these statements were generally accepted, were obviously true, and had been so oft-repeated as to have become platitudes.

Dr. Felstead had little doubt that the development of the clinical sense to its highest degree was and would continue to be the greatest and most important factor in the early diagnosis of cancer and that it would be in this direction that the most striking results would be obtained in the future. He believed that in the majority of country practitioners this clinical sense was well developed and it needed only the stimulus of organization and encouragement to bring it to the desired state. There should be constant organized effort to direct general public attention to the essentials of careful clinical examination.

To be of value, the clinical examination should include a careful and searching history-taking, concentrating on the important symptoms and disregarding the irrelevant, while the medical practitioner was alert to catch the slight but unique deviation from the normal that was so often the key to diagnosis. The clinical examination should include a general rapid examination of all the main systems of the body, with concentration on the particular system under suspicion and the employment of whatever mechanical aids might be of assistance. In this category would come the pelvic examination with the ready use of the speculum, the proctoscope and the cystoscope; the catheter specimen of urine with its centrifugalization and microscopic and chemical examinations; the test meal and the occult blood examination, and many others which there was no need to enumerate but which were all well within reach of the general practitioner. All these might fail to reveal the condition unless there was present in the mind of the examiner an expectancy of the possibilities of the case and, above all, that intuitive sense of something different in the history or the examination which singled the case out from the ordinary.

Turning then to the other important methods of diagnosis, there was this difference to be noticed between the pathological and the radiological. With the latter the patient had to present himself before the radiologist and his apparatus; with the former the presence of the patient was not required; only his secretions or the portion of his tumour had to be sent to the expert. In those cases in which a biopsy was permissible or in which the secretions had to be examined by the expert pathologist, it was rarely that the delay of a few days was important; and although it was desirable that eventually expertness in pathological work should be developed in the country, the present system of sending specimens by post to the capital city met the need of the country practitioner fairly well. The radiological examination, however, had either to be carried out by the country practitioner himself or else the patient had to make the often long and expensive journey to the city. In many cases this second course was found to be impracticable, generally on the score of expense, sometimes on account of the physical or mental condition of the patient, and sometimes on account of the complexities of family life. Even if it was agreed to by the patient, there was sometimes of necessity a dangerous delay in making the arrangements for the long journey and perhaps prolonged stay away from home. For whatever reason, it was surprising how many patients preferred to suffer rather than to take this course.

The gastro-intestinal tract and the urinary tract were the two great systems in which expert radiological diagnosis was required, and although X ray apparatus of some sort or another was nowadays in use in most country towns, the standard of diagnosis of lesions in these systems was low. Generally speaking, the country practitioner, with his multifarious duties, had had neither the time nor the opportunity to develop fully his technique and diagnostic abilities in this direction. Hitherto, then, when early cancer of these systems had been suspected the medical practitioner had felt bound to urge the patient to make the necessary journey for the purpose of

obtaining expert radiological opinion. When, for the reasons before mentioned, the patient had refused this procedure, the country practitioner had been forced to fall back on his own radiological equipment and skill, such as they were.

Taking these matters into account, it seemed that more early cancer of the gastro-intestinal and urinary tracts would be diagnosed by developing the standard of X ray work in the country than by imposing on the country practitioner the moral obligation of sending all doubtful cases to the city. A high standard of X ray work implied good equipment, a technique carefully followed, and, above all, the diagnostic knowledge that only training and experience could give. Of these three factors the first and second were well within reach; the other could be developed only when the busy practitioner could give up some of his other routine work in order to devote the necessary time to being trained in the art of producing and reading the best skiagrams. In this connexion Dr. Felstead saw hope in the formation of teams or clinics in the country. This tendency was apparently gaining ground; it should help to make it possible for one practitioner in each country centre to find the time and opportunity for the development of radiological skill.

In this way could be visualized the "planned diagnostic centre" outlined in Dr. Hone's paper. For the education of practitioners engaging in this special work, adequate instructional courses in a city clinic would be essential, with revisional courses from time to time. These courses might deal with radiological technique and interpretation and with those biochemical methods which were particularly applicable to the diagnosis of cancer.

In the future, diagnostic facilities must be developed in the country: (i) The training and encouragement of the general practitioner in all matters pertaining to full and careful clinical examination and the sustaining of his interest in the case if it should be necessary to transfer the patient from one country town to a country diagnostic centre. (ii) The training of at least one practitioner in certain centres in radiology.

The matter of treatment presented greater difficulty. The expense of equipment and the need for intensive training in the use of X rays and radium precluded any but the specialist assured of a large field of work from engaging in this work merely with his own resources. Yet many patients in the country were going without this essential treatment. The three possibilities were apparently: (i) The present system of sending all cases to a capital city. The defects of this system had been pointed out in discussing diagnostic methods. (ii) The periodic visiting of country centres by a specialist in radiological treatment. Here the delay which would necessarily occur at times between such visits would be a grave disadvantage and the system would probably be unworkable. Moreover, expensive equipment would have to be permanently installed and maintained in each diagnostic centre. Apparently, then, the only practicable arrangement was (iii) the permanently domiciled specialist. He could be either the already practising country practitioner who would be prepared to give up his routine work and undergo the necessary training or he might be the already trained specialist. In either case it would probably be admitted that in the matter of equipment and training the expense would be greater than he could individually bear.

DR. H. I. HOLMES said that in the treatment of cancer country practitioners were concerned with three factors: the patient, the general practitioner and the specialist. The patient was the victim of a serious disease and looked to the general practitioner for guidance; the general practitioner recognized his limited resources and wished to obtain special assistance; whilst the specialist desired that, as far as possible, all cases should receive special treatment at special departments; and therein lay the difficulty. While the patient looked to his medical attendant for guidance, the general practitioner in his turn looked to the specialist for help and advice; advice should in each instance be given, not only in the best of faith, but also with due consideration for the patient's ability to follow it.

Diagnosis should in most cases be made clinically, perhaps with the assistance of X ray examination, gastric analysis, biopsy *et cetera*; these methods of examination should be obtainable at any large provincial centre. Many of the external cancers should be not only diagnosed; they might also justifiably be treated, if not by the general practitioner, then at the nearest large provincial town or base hospital, by one who gave particular attention to such cases. It should not be necessary, and for financial reasons it was frequently impossible, for a patient to travel tens or hundreds of miles to a metropolitan centre for diagnosis and treatment of his condition. For this reason it was essential: (i) that the general practitioner should be able to attend cancer centres (clinics) and to obtain knowledge of and acquire proficiency in handling cancer remedies; (ii) that those in charge of such centres should provide facilities for the acquiring of such knowledge and proficiency, without its being necessary to gain degrees or pass examinations in radiology; (iii) that the cancer authorities should by regular publications inform the general practitioner of all advances in cancer treatment. The general practitioner did not want theories, but facts; the trust given him by his patient demanded that he should not experiment, but should recommend only treatment which held out a fair prospect of cure, or at least a pronounced amelioration of his condition. One had only to appreciate the attitude of a patient who journeyed perhaps one hundred miles or more and involved himself or his family in the additional cost of city living and transport, in order that he might have radium or X ray therapy; this patient might perhaps make several visits, only to learn finally that metastatic deposits were already present, and return to die in a country hospital, perhaps leaving his own medical attendant unpaid. There should be cooperation between the specialist, the general practitioner and the patient; and the patient should not be involved in an expenditure beyond his means without hope of final cure.

All large centres, such as the larger provincial towns, and all base hospitals should have not only a pathological laboratory for diagnosis, and surgeons of sufficient experience to undertake suitable major operations for removal of cancer growths, but also practitioners who were proficient in the use of diathermy, radium or radon, or other recognized treatments, and perhaps a deep X ray therapy plant. Any centre so constituted should inform the general practitioner of the treatment adopted, and the general practitioner should in his turn report the progress of the case from time to time. Dr. Holmes knew the danger of improper application of radium, X rays *et cetera*; he appreciated the dangers of inefficient treatment resulting in stimulation of growths; but many cases could not be transported and so went untreated. The ideal could not always be achieved, and the greatest good for the greatest number would be achieved not by exclusive treatment limited to cancer centres in large cities, but by increasing the facilities to the patient and assuring as far as possible the efficiency and knowledge of those adopting the treatment. It should be remembered that behind all forms of specialism the spadework of medicine was in the hands of the general practitioner.

DR. WARNFORD MOPPETT said that he, as a laboratory man, realized the preeminent clinical importance of the general practitioner. He suggested that the Commonwealth Government should prepare a form like a case sheet for use by medical practitioners in connexion with persons suspected of malignant disease. He had recently read that the average medical practitioner saw only one cancer patient each year; he could scarcely credit this, but he thought that if the form suggested by him were used, malignant disease might sometimes be brought to light at an earlier stage.

DR. F. A. MAGUIRE said that the remarks of both Dr. Felstead and Dr. Holmes might be summed up under three headings: education, the development of clinical sense, and treatment. These were largely matters of post-graduate education. In New South Wales conferences had taken place between the Cancer Research Committee of the University of Sydney and the New South Wales Post-Graduate Committee in Medicine, bodies which were both connected with the University of Sydney. It had been decided that teams would be sent to different country

centres; the teams would consist of specialists, and demonstrations would be given at week-ends. At these demonstrations emphasis would be laid on the essential factors in diagnosis. Later in the year a three weeks' intensive post-graduate course on cancer diagnosis would be held; and one-day demonstrations in methods of treatment would be arranged.

DR. J. NEWMAN MORRIS said that Dr. Maguire had emphasized the educational aspect, but Dr. Felstead had pointed out that the majority of Victorian country practitioners were well trained in clinical diagnosis and were alert, but they had to retain their alertness—it was a matter of not thinking rather than of not knowing. The trouble was that country practitioners had not the necessary facilities. This problem had often been discussed at country meetings of the Victorian Branch of the British Medical Association. The conference should do something to improve diagnostic facilities in the country; the State governments should be urged to develop diagnostic facilities.

DR. W. M. SINCLAIR (Toowoomba) said that cancer generally arose as a result of chronic irritation. It was necessary to find the cause of chronic irritation and remove it. If all septic foci were removed the death rate from cancer would be made less. Dr. Sinclair also referred to food deficiency; he thought that if people had a suitable well-balanced diet they would be more resistant to irritation.

DR. L. M. MCKILLOP (Brisbane) said that four years previously the Queensland Cancer Trust had issued a pamphlet dealing with cancer. The trust had been active in several directions. An effort had been made to decentralize cancer diagnosis and treatment by the establishment of subcentres at Rockhampton, Mackay, Townsville and Cairns. Members of the trust had given lectures at these centres. Provision had been made for persons to attend the centres—the expenses of travelling had been met and sometimes the patient's board had been paid for him. Dr. McKillop concluded by saying that even in Brisbane some of the modern methods of investigation were not available; he referred particularly to examination of the peristaltic movements of the stomach in early gastric cancer and to the Chaoul machine, which was held by certain authorities to be destined to take the place of radium.

DR. N. MCARTHUR (Melbourne) protested against the use of the term cancer age. It was dangerous; some of the most tragic cases of cancer that he had seen had occurred before the so-called cancer age.

DR. F. P. SANDES (Sydney) said that he wished to make a provocative statement. If it was impossible for cancer patients to be brought from the country for treatment at large centres, he thought that the Federal Health Department might make arrangements for experts in radium therapy to go to the country, somewhat in the fashion of the travelling team described by Dr. Maguire. In this way more adequate use of radium might be made.

DR. M. J. HOLMES agreed that permanent clinics, with specially trained experts in examination and diagnosis should be established in suitable large provincial centres. The arrangement, however, should be carried a stage further—these clinics should be competent to select the method of treatment best suited to each individual patient. For example, it could be decided whether it was practicable for the general practitioner with the resources at his command to give the patient adequate treatment, or whether special treatment was required. If special treatment was required, it should be determined whether that treatment could be given at the base or whether the patient should be sent to a metropolitan centre. The permanent country clinics should be well equipped with apparatus and personnel to examine all patients referred by general practitioners for advice.

Dr. Cumpston, in closing the discussion, said that the meeting was unanimously in favour of the formation of extrametropolitan centres. No recommendations were made, as the whole question of organization for the control of cancer was to be considered later on.

Cancer of the Tongue.

DR. M. J. HOLMES discussed the results of cancer of the tongue by various methods. He showed on the screen a series of tables in which the results were stated. The substance of his remarks, together with the more important of his tables, is published in this issue at page 203.

DR. HENRY SEARBY read a paper entitled "The Treatment of Carcinoma of the Tongue" (see page 210).

DR. I. B. JOSE read a paper in which he described the results of treatment of cancer of the tongue at the Adelaide Hospital (see page 217).

DR. VAL MCDOWALL read a paper entitled "Some Observations in Radium Treatment of Cancer of the Tongue" (see page 218).

SIR HENRY NEWLAND read a paper in which he dealt with some surgical aspects of cancer of the tongue. He described the surgical removal of the tongue and of the gland-bearing area, and illustrated his remarks by lantern slides showing the several stages of the dissection.

DR. W. R. FRAYNE read a paper entitled "Deep X Ray Therapy in the Treatment of Cancer of the Tongue" (see page 227).

DR. L. J. CLENDINNEN read a paper on radiological aspects of cancer of the tongue (see page 228).

Physics and Radiotherapy.

DR. C. E. EDDY read a paper in which he discussed some recent developments in radiological physics. He appended to his paper a useful bibliography comprising articles published during the previous twelve months. This paper was a review of the literature containing the advances which had been made in this subject during the past year and was itself abridged from the large number of papers given in the bibliography.

Dr. Eddy pointed out that the advances made in X ray generating equipment during the last year had not been so great as previously, in that production of generators had now been established along more or less settled lines. The operation of the modern deep therapy tubes, which are so constructed that current flows and X rays are produced only when the voltage is high, were discussed. Information was also given regarding the operation of air-cooled and water-cooled tubes on various circuits.

The errors to which clinical dosimeters are subjected, particularly in methods of determining depth dose, were discussed and new instruments for measuring dosage rate were described.

The physical features of the contact therapy equipment, as used by Chaoul, of Berlin, were discussed, and information regarding the depth doses obtained with this method of treatment was given. The similarity in physical features to the doses given by radium at a distance was discussed. Dr. Eddy said that the contact therapy equipment had been designed to take the place of teleradium treatment and did not replace deep X ray therapy.

The efforts which are being made to determine radium dosages in terms of the international röntgen were described. Dr. Eddy said that the necessity for such a method of measurement was becoming particularly important when combined treatment by X rays and radium was used, and its adoption would enable valuable information to be gained on the question of the biological action of various wave-lengths.

The increasing attention which is being devoted to the time factor in radiation therapy was discussed, particularly with reference to a graphical method of representing the cumulative effect of divided doses. Dr. Eddy considered that the biological effect of divided doses depended not only upon the total dose given, but also upon the time intervals between the individual applications. Treatments based upon a maximum cumulative dose were believed to be of advantage when attacking tumours of the more radio-resistant type.

The recent advances in knowledge regarding the variation of biological action with wave-length and with blood changes produced by radiation were reviewed. Dr. Eddy said that this was particularly important from the point of view of the protection of radiological workers.

Several possible future developments in radiation therapy were described, particularly the possibilities of using cathode rays, high speed neurones and artificially radio-active materials as therapeutic agents. Although these methods were still in the experimental stage, Dr. Eddy believed that a study of these radiations would throw new light on the biological effects of radiation.

The members of the conference had before them also copies of three other papers which were not read. These were: (*a*) a statment from England, from Professor T. H. Laby, on developments in X ray and radium therapy in England; (*b*) a review of research carried out during 1935 by the Cancer Research Committee of the University of Sydney; (*c*) a report on developments in connexion with biochemical research into the nature of substances causing cancer and into the biological effects of radiation, which had been prepared by Dr. George Harker, of the staff of the Cancer Research Committee of the University of Sydney.

DR. WARNFORD MOPPETT showed and explained a film illustrating the principles of the test that he had elaborated for cancer. Dr. Moppett published an account of his test in THE MEDICAL JOURNAL OF AUSTRALIA of May 26, 1934.

PROFESSOR O. U. VONWILLER expressed his appreciation of Dr. Eddy's paper and regretted that there was no time for adequate discussion. Workers in the natural sciences had contributions to make and wished not only to hear comments on their own work, but to comment on the work of others. He thought that at future conferences greater opportunities should be provided for discussion of research aspects. He therefore moved:

> That at future conferences arrangements be made for the holding of at least one session devoted to presentation of papers and reports on work done in Australia in various branches of natural science (physical and biological) closely related with cancer problems.

The motion was seconded by Professor A. O. Ross.

PROFESSOR H. L. BROSE, in supporting the motion, referred to the biochemical aspect of research and pointed out that a great deal of remarkably successful work had been done.

DR. F. A. MAGUIRE agreed that such a session of the conference should be held, but he thought the session should be so arranged that everyone could attend. He said that in connexion with the work of the Cancer Research Committee of the University of Sydney seminars were held and that workers in natural science and clinicians attended; the arrangement worked admirably. He moved, as an addition to Professor Vonwiller's motion, that:

> It is desirable that such sessions be full sessions of the conference, although, if this cannot be arranged, such sessions might be held separately and invitations to attend these sessions should be given to workers in those fields not otherwise participating in the work of the conference.

DR. J. H. L. CUMPSTON, before putting the motion to the meeting, traced the history of the conferences and pointed out that for the first time four professors of physics were present. From time to time it had been suggested that separate sessions of research workers should be held, but the members of the conference had always rejected the suggestion. The present conference was being held in Melbourne in order that the clinical side of cancer should be adequately considered. In these circumstances it had not been possible to give sufficient time for discussion of research.

Professor Vonwiller's motion., with the addendum moved by Dr. Maguire, was carried.

Organization against Cancer.

Organization for the control of cancer was discussed. This discussion was based on several documents that had been distributed among members of the conference. These included the reviews by Dr. Holmes of developments in connexion with cancer control and of cancer statistics, the review by Dr. C. E. Eddy of the activities of the Commonwealth X Ray and Radium Laboratory, a report by Dr. L. M. McKillop prepared for the Commonwealth Government after his visit to cancer clinics overseas, and a plan for cancer control prepared by Dr. Phillip Parkinson.

As a basis for discussion Dr. McKillop moved the several recommendations and suggestions that he had made at the end of his report.

The first and second recommendations were to the effect that the Commonwealth Government should regard cancer as a disease of national importance and that a consultative committee should be formed to draw up a nation-wide scheme to study and combat cancer. Dr. McKillop pointed out that the opportunities for clinical, sociological and statistical research in the Commonwealth were ideal. Australia's death rate from cancer was amongst the highest in the world, and he thought that if his recommendations were put into effect Australia would occupy the proud position of being the first country to stand officially behind the study of the cancer problem. By the appointment of a consultative committee such as he suggested, uniformity of action could alone be achieved, waste of effort and overlapping could be avoided, and effective cooperation could be secured between medical experts and laymen.

At this stage Dr. Phillip Parkinson introduced his plan of cancer control. This plan provided for the establishment by the Commonwealth Government of a Cancer Commission, responsible to Parliament through the Minister for Health. The commission should consist of a chairman and two commissioners; it should be empowered to take advice from what sources it saw fit to approach; it should also be responsible for the disbursing of funds, the appointment of officers, the establishment of institutions for the diagnosis and treatment of cancer, the provision of funds for continued research, the determination of the nature and direction of research, and the undertaking of a definite and continuous publicity campaign. He moved that the conference should recommend to the Commonwealth Government, through the Minister for Health, the establishment of a commission on the lines that he had suggested.

SIR HENRY NEWLAND moved:

> That this conference recommends that the Commonwealth Government, with the cooperation of the State governments, form a National Medical Research Council, on which there shall be (*a*) representatives of the Commonwealth and State Health Departments; (*b*) representatives of the universities, British Medical Association, Royal Australasian College of Surgeons and other appropriate bodies.

Sir Henry Newland pointed out that the question of the creation of such a body had been urged by the Royal Commission on Health; it had also been discussed by the Federal Health Council and the Federal Council of the British Medical Association in Australia. Some of the States were already interested in the proposal, and the Premier of South Australia had told him that the Government of South Australia would give its support. It was obvious that valuable research was already being carried out in Australia; he believed, however, that a Medical Research Council would bring about an expansion of research and useful results. He thought that the existing Federal Health Council might be used as a nucleus and that other representatives should be added from the bodies named in his motion.

SIR HUGH DEVINE seconded the motion and said that not only cancer but problems in every branch of medical science awaited solution.

DR. F. S. HONE supported the motion; and DAME CONSTANCE D'ARCY, in supporting the motion, said that she was opposed to Dr. Parkinson's scheme, as it involved far too great an expenditure of money.

Sir Henry Newland's motion was carried.

Dr. McKillop's recommendations were carried in an amended form as follows:

That this conference, recognizing the serious importance of cancer, recommends the Commonwealth Government to accept cancer as a public health problem of national importance.

Dr. Parkinson's motion for the establishment of a Commonwealth Cancer Conference was put to the meeting but was lost.

Diagnosis in Country Centres.

Another of Dr. McKillop's recommendations was that "every effort be made to improve the standard of cancer diagnosis, especially in country centres". Dr. McKillop thought that if general practitioners could be made "cancer-minded", so that disease could be suspected and discovered during the symptomless and silent period, a great advance in cancer prevention and cure would soon occur.

DR. B. T. ZWAR thought that the words "the facilities for the early diagnosis of cancer cases" should be inserted in Dr. McKillop's recommendation after the word "improve". Dr. Zwar's suggestion was accepted and the amended recommendation was adopted.

The Country Practitioner and Cancer.

Another of Dr. McKillop's recommendations was as follows: That, except in the simplest cases, general practitioners should be urged to send their cancer patients to the larger centres for treatment, as only in such centres is it economic to install and maintain large amounts of radium and efficient deep X ray machines, operated by highly trained specialists, where a qualified physicist can be employed and where also any new and promising method of treatment can be tried out under proper check conditions.

The discussion on this recommendation was really a continuation of the discussion that had taken place earlier in the conference after the addresses given by Dr. G. R. Felstead and Dr. H. I. Holmes.

In submitting this recommendation, Dr. McKillop said that it was not an attempt to take something from the general practitioner; it was intended that the cancer patient should be given the best possible chance.

DR. F. A. MAGUIRE said that he would be pleased to see the recommendation broadened. Many general practitioners had had experience in the treatment of cancer—some had been radium registrars at large centres—others could easily acquire experience.

DR. P. P. LYNCH referred to experience in New Zealand and insisted that adequate treatment of cancer could be carried out only at a properly equipped centre.

DR. F. S. HONE said that the rights of the general practitioner should be safeguarded.

DR. F. P. SANDES thought that the recommendation should be amended so that it would refer to practitioners who had no special facilities for cancer treatment.

DR. G. R. FELSTEAD held that country practitioners did not need to be urged to send their cancer patients for treatment at properly equipped centres; the trouble was to get the patients to go.

DR. H. I. HOLMES said that it was not always easy to determine which were the simple cases; the difficulty was to know what treatment should be carried out. Moreover, a patient might be recommended to go away from his home to undertake a costly treatment that would do him no good. The patient would in these circumstances resent the advice that he had been given.

DR. R. D. WRIGHT thought that it was important that general practitioners should be informed of the results that were being obtained. He thought that if this were done they would be in a better position to advise their patients.

DR. F. S. HONE moved:

That this conference, recognizing the importance of the patient with cancer being provided with modern facilities for early diagnosis and efficient treatment, recommends to each State organization that it should take the appropriate steps to bring about the closest possible cooperation in their respective States between general practitioners and those centres which are fully equipped for the treatment of cancer.

At this stage the Chairman intervened and said that the discussion was becoming diffuse; there were a number of suggestions and motions before the conference. It was obvious that in cancer, as in many other public health matters, the major part of the problem lay in extra-metropolitan districts. He urged that nothing should be done that might in any way interfere with the efficiency of the general practitioner.

DR. J. NEWMAN MORRIS supported Dr. Hone's motion, but thought that a committee should be appointed to report after due inquiry to the next conference. He thought that this committee should have as members representatives of the State organizations and of the Branches of the British Medical Association.

Dr. Cumpston said that after considering the previous discussion on the provision of diagnostic and treatment facilities in country districts and the present discussion he had drafted a motion embodying the several suggestions made. Dr. Cumpston's motion was as follows:

This conference recommends that general practitioners who have not special experience or local facilities should be encouraged to send cancer patients to the larger centres for any necessary special treatment.

At the same time it is necessary to increase as rapidly as possible the facilities available to all extra-metropolitan practitioners in respect of diagnosis and treatment, and to keep all members of the profession progressively informed in respect of all progress in cancer treatment and of the results obtained in cases of cancer at the best equipped centres.

The conference recognizes the importance of the patient with cancer being provided with modern facilities for early diagnosis and efficient treatment, and recommends to each State organization to take the appropriate steps to bring about the closest possible cooperation in their respective States between general practitioners and centres in their State that are fully equipped for the treatment of cancer.

This conference appoints a committee to report to the next conference on the most efficient means of securing this cooperation. This committee should contain representatives of each State cancer organization and of the British Medical Association and the Australian and New Zealand Association of Radiology. That the conveners be Dr. F. S. Hone and Sir Henry Newland, with power to coopt members from each State cancer organization.

It is considered desirable to bring to the attention of State governments the necessity for effective arrangements for bringing to places where adequate treatment is available patients who have not such facilities available in their localities or residence.

The motion was carried unanimously.

The Establishment of Tumour Institutes.

Another recommendation put forward by Dr. McKillop was that each capital city should aim at erecting and maintaining, partly by governmental aid and partly by donation and paying patients' fees, a thoroughly up-to-date tumour institute, in which poor and rich alike could obtain highly specialized treatment and in which suitable research could be carried out.

It was pointed out that the question of research had already been considered. Reference to research was therefore omitted from the recommendation. On being put to the meeting the amended recommendation was carried by 58 votes to 6.

The Suppression of Quackery.

Another recommendation made by Dr. McKillop was directed towards the strict suppression by legislation of all forms of quackery in regard to cancer diagnosis and treatment.

In the discussion on this question the view was expressed that it would be impossible to secure the passage of legislation that would suppress all quackery, but that it might be possible to have legislation carried that would prevent the advertising of quacks.

After discussion it was resolved:

> This conference recommends that, as a first measure, the prohibition of advertising of cancer cures should be instituted, and the Commonwealth Government be asked to bring this matter before the next Premiers' Conference.

Physical Services.

Another recommendation put forward by Dr. McKillop was that at each clinic or group of clinics a qualified physicist should be employed to compute the dosages, filtration, depth penetration and other problems associated with radiation. Dr. F. S. Hone seconded a motion by Dr. McKillop to this effect.

It was pointed out that action of this kind had already been taken in several of the States.

PROFESSOR O. U. VONWILLER supported the motion and suggested that the resolution should be conveyed by the Commonwealth Government to the bodies or organizations concerned.

Future Conferences.

The scope and meeting place of future conferences was discusssed.

DR. R. D. WRIGHT spoke strongly in favour of holding the conferences at Canberra. He thought that the conference had lost a good deal of its effectiveness by going away from Canberra.

It was pointed out that the sesqui-centenary of New South Wales was to be celebrated in 1938, and it was resolved, on the motion of Dr. L. M. McKillop:

> That the conference should be held at Canberra next year (1937) and in Sydney in 1938, and that the Sydney congress should be one to which international delegates should be invited, the Commonwealth Government being asked to contribute towards the expenses of overseas delegates.

It was also resolved, on the motion of Dr. Val McDowall, that skin cancer, treatment and prevention, should be the major subject for discussion at the next conference in Canberra.

Periodical Examination of the Individual.

DR. B. T. ZWAR referred again to the periodical examination of people in order to detect the early evidence of disease. He said that it was sometimes recommended that persons over forty-five years of age should be subjected to periodical examination. He thought that this age was too late. He moved:

> That this conference affirms the principle that regular periodic examinations of all persons over the age of thirty-five years for the early detection of cancer is very desirable.

The motion was carried.

An Australian Journal on Cancer.

DR. F. A. MAGUIRE, Chairman of the Cancer Research Committee of the University of Sydney, reminded those present that his committee had been asked at the last conference to carry on the publication of its cancer journal for another year; and that the sixth conference resolved that a committee should be appointed to draw up a scheme for the publication of an Australian Cancer Journal. This committee had been appointed. Dr. Maguire reported that letters had been sent to the several State organizations, and he indicated that the response had been far from satisfactory. A journal was desired, but no one seemed inclined to give it much financial support. The various bodies would be circularized again, but in the meantime the Cancer Research Committee of the University of Sydney reserved to itself the right to consider whether it would continue to publish its journal.

DR. R. D. WRIGHT pointed out that it was necessary to know what kind of material would be published in the proposed journal.

After discussion it was resolved:

> That a committee consisting of Professor MacCallum of Melbourne, Professor Welsh of Sydney, Professor Cleland of Adelaide, Professor Dew of Sydney, and Professor Vonwiller of Sydney be asked to draw up the form of material which would be desirable in an Australian Journal of Cancer.

It was also resolved:

> That the Cancer Research Committee of the University of Sydney be asked to continue the publication of the journal for another year.

A Cancer Commission.

At this stage of the conference Dr. F. P. Sandes asked permission to reopen the question of organization of the control of cancer in Australia. He held that at the previous discussion nothing had been accomplished. He moved:

> That it be a recommendation from this conference to the Commonwealth Government that a committee be appointed to prepare the draft of a scheme for the establishment of an Australian Cancer Commission.
>
> That this committee shall be composed of: (*a*) Two representatives of the Federal Department of Health. (*b*) Two representatives of the British Medical Association, nominated by the Federal Council of that body. (*c*) Two representatives of the Royal Australasian College of Surgeons, nominated by the Council of the College. (*d*) Two representatives of the Australian and New Zealand Association of Radiology, nominated by its Council. (*e*) A number of representatives of the general public, the universities, the hospitals or other appropriate bodies, nominated by the Federal Minister for Health.
>
> That, in the event of the Federal Minister for Health being unable to act continuously as chairman of this committee, a deputy chairman be appointed by the Commonwealth Government.

After Dr. F. A. Maguire had suggested that the words "and representatives from the existing cancer organizations" should be added, Dr. W. Ostermeyer seconded the motion, which was carried.

Pathological Classification of Cancer and Medical Certification of Deaths from Cancer.

DR. M. J. HOLMES reported that the resolution of the sixth conference relating to medical certification of deaths from cancer had been conveyed to the Commonwealth Statistician. *Inter alia* the Commonwealth Statistician had suggested that hospitals with adequate pathological departments might supply suitable material for compilation regarding the incidence of pathological types of cancer. Dr. Holmes explained how the hospitals would undertake this work. He said that he had discussed the matter with the available members of the committee appointed at the last conference, and on his own and their behalf he moved:

> In order that reliable data regarding pathological types of cancer and the mortality therefrom may be available this conference recommends:
>
> (1) That wherever practicable a system be introduced under which hospitals having properly equipped pathological departments should record particulars regarding pathological types of cancer entering the hospitals, on cards specially framed for the purpose.

(2) That these cards, or quarterly statements perpared from them, should be forwarded by the hospitals to the Commonwealth Statistician with a view to compilation in the *Australian Demography Bulletin*.

(3) That all suitably equipped hospitals be urged to adopt this system and procedure.

(4) That, since it will be necessary for all hospitals adopting this system to work to a uniform plan of pathological classification of tumours, arrangements be made to prepare such a plan; and that Professor Welsh and Professor MacCallum be invited to draft a plan.

(5) That Professor MacCallum be appointed to the subcommittee already formed by the Australian Cancer Conference to consider the question of the pathological classification of cancer and medical certification of deaths from cancer; and that this subcommittee prepare a card indicating these particulars, which the selected hospitals should be asked to record.

The motion was seconded by Dr. F. P. Sandes and carried.

Duty on X Ray Tubes.

DR. A. T. NISBET discussed the possibility of the imposition of a preferential tariff on X ray tubes. He moved:

That this conference recommends to the Minister for Health that before any duty be placed on X ray tubes opportunity be given for radiological experts to advise on the matter.

The motion was carried.

Public Education.

CAPTAIN E. R. B. PIKE referred to the education of the public in matters relating to cancer. He moved:

That this conference recommends that the Broadcasting Commission be requested to arrange for talks on cancer control in each State—for example, a series of six or seven addresses given weekly or bi-weekly three times a year, each address to occupy about ten minutes.

That this conference recommends that the Council of the British Medical Association be asked to encourage medical practitioners to take part in the campaign for public education in cancer control.

The motions were carried.

The Placing of Radon Needles in the Treatment of Cancer of the Breast.

DR. W. P. HOLMAN read a paper by himself and DR. C. CRAIG on the placing of radon needles in the treatment of cancer of the breast. This paper will be published in a subsequent issue.

Rodent Ulcer.

SIR HENRY NEWLAND read a paper entitled "Rodent Ulcer: Its Development on the Limbs" (see page 221).

Teratomata.

DR. R. A. WILLIS gave a lecturette on the structure of teratomata, illustrated by photomicrographs and maps of these tumours. The principal points stressed were: (i) the great frequency with which nervous tissue was present in teratomata and the great variety of this tissue; (ii) the absence of any evidence, from topographical studies of serial slabs, that a teratoma represented a malformed fœtus; (iii) the association of certain tissues in these growths, for example, skeletal tissues with nervous tissue, or smooth muscle with epithelial cavities. Dr. Willis showed also lantern slides of some of the rarer components of teratomata, such as renal tissue.

The Modes of Extension and Metastasis of Malignant Tumours.

Dr. Willis also gave a lantern lecturette on the modes of extension and metastasis of malignant tumours. The slides shown illustrated the invasion of lymphatics, blood vessels, serous cavities and epithelial cavities; the carriage of detached emboli in the blood stream and their arrest in the lungs or other organs; the extension of tumours within muscle fibres; the invasion of the heart cavities by metastatic growths in the heart wall; and the development of transperitoneal metastases in a hernial sac.

Chaoul Therapy Film.

DR. L. M. MCKILLOP showed a film setting out the methods of application and the end results of the Chaoul method of contact therapy. The majority of the lesions were of the superficial type and included rodent ulcers about the canthi and eyelids, epitheliomata of the lips, melanomata of the skin, carcinoma of the tongue and carcinoma of the rectum—access to which had previously been obtained by surgery. One of the most striking features of the method was shown to be the rapidity with which healing was obtained with an almost invisible residual scar. During the showing of the film, which was four hundred feet long, Dr. McKillop made some explanatory remarks, in which he pointed out that in Professor Chaoul's clinic at the Charité Hospital in Berlin, operation for melanoma of the skin had been abandoned, as the results had been almost invariably unsatisfactory. Operation had been replaced by contact therapy radiation, in which up to a total of 15,000 to 20,000 Röntgen units were delivered into these tumours, resulting in the majority of cases in complete and apparently permanent disappearance of the neoplasm.

Prophylactic irradiation of the appropriate glandular area was, if necessary, carried out coincidently, the glands being surgically removed some four to six weeks later if they had not disappeared. Dr. McKillop pointed out that the real reason why such large doses of radiation, measured in international units, could be delivered into a given mass of neoplasm was that the depth penetration was usually such that the reparative layer of the skin was saved and that, as the radiation was capable of being accurately focused upon the radiated area, the tumour "bed" (the surrounding zone of tissue) was not damaged and repair could take place. He pointed out that the machine at the Queensland Cancer Trust clinic in Brisbane had then been working for nearly ten weeks and already results quite in keeping with those demonstrated on the film had been obtained. He hoped to be in a position in the near future to submit his results with this method of treatment.

Gynæcological Cancer.

DR. J. M. BUCHANAN showed a series of patients demonstrating the management of gynæcological cancer.

The first patient, aged forty-seven years, had had *carcinoma vulvæ* and was first seen in May, 1933. Radium treatment had been ineffective in healing the primary ulcer, and treatment in the Austin Hospital had included bilateral excision of the inguinal and internal iliac lymph gland areas after the method of Taussig and, a fortnight later, radical vulvectomy.

After a stormy period, due to radiation fibrosis in the area, healing was sound and complete, and the patient was in excellent condition from all points of view.

Dr. Buchanan's next patient, a woman aged sixty years, had had radium treatment (6,000 milligramme-hours) for *carcinoma cervicis* (Stage III) in March, 1933, followed by saturation deep X ray therapy. Progress had been satisfactory till February, 1934, when recurrent nodules in the vestibule appeared and were treated by interstitial radon seed insertion, 5 by 1 seeds being used.

The nodule had disappeared; but another appeared in December, 1934, and was again treated by radon seeds (4 by 1). The patient remained well till November, 1935, when another nodule appeared on the fourchette, and 5 by 1 radon seeds were implanted. There was at the time of this meeting no evidence of malignant disease and the pelvis was clinically normal.

Dr. Buchanan now showed a woman, aged fifty-four years, whose case illustrated the importance of regular following up in these conditions. Primary *carcinoma cervicis* (Stage III) had been treated in July, 1934, by radium (6,000 milligramme-hours) and deep therapy. The patient had remained well and free from symptoms till routine examination in November, 1935, showed a small recurrent cervical nodule. Further surface radiation (2,000 milligramme-hours) was applied, and at the time of the meeting the patient was well and free from symptoms.

The fourth patient shown by Dr. Buchanan was a woman, aged forty-two years, who had had primary *carcinoma cervicis* originating in association with complete procidentia. She was first seen in August, 1934. Vaginal operation was considered, but rejected in favour of primary radiation. This was given in the form of 6,000 milligramme-hours and saturation X ray therapy. During convalescence a very large left parametric swelling was observed. This, however, subsided in time and the patient left the Austin Hospital for routine follow-up supervision in November, 1934. The scarring of the left parametrium completely cured the prolapsus, but later the parametric thickening became nodular, and in September, 1935, swelling of the left leg became apparent. Further deep therapy in the Austin Hospital was given and the condition was improving. It was doubtful, however, whether permanent cure was likely to occur in this case, although it was an ideal case for primary radium therapy.

Dr. Buchanan's last case was that of a woman, aged twenty-seven years, who was admitted to the Austin Hospital in April, 1934, having undergone radon treatment and Wertheim hysterectomy for *carcinoma cervicis* at another hospital. Recto-vaginal fistula had occurred and the patient had a left iliac colostomy and a sinus in the sacrum, thought to be due to secondary carcinoma. Prolonged observation, however, convinced Dr. Buchanan that the bony destruction was radio-necrosis; and after several attempts the sequestra had been removed and the sinus healed. At the time of the meeting the recto-vaginal fistula was healing and the general condition of the patient was excellent. She had been a morphine addict from pain, but was now pain-free and had gained 12·6 kilograms (two stone) in weight. It was probable that a permanent cure would be effected.

DAME CONSTANCE D'ARCY and DR. F. A. MAGUIRE (Sydney) considered that rather larger doses of radium could have been employed to advantage, but after discussion of the screenage of the radium available, agreed that maximum therapeutic doses were being employed in the Austin Hospital.

Demonstration of the Tissue Culture of Cerebral Tumours.

DR. LEONARD B. COX said that work on the tissue culture of cerebral tumours had been undertaken for the better understanding of the cytology, since there was still much doubt as to the exact nature of certain of the cell types encountered. All the technical work had been done at the Baker Institute by Miss M. Cranage in association with Mr. J. Sutherland.

The media employed were embryo extract, embryo extract with human and hen plasma, embryo extract and human plasma, and human serum.

An example of each of five tumour types was shown. The ordinary paraffin section was first demonstrated and then stained preparations of each tumour in tissue culture.

1. *Glioblastoma multiforme.* Here a migration of large spindle and astrocyte-like cells was demonstrated, with many multinucleated cells similar to those visible in ordinary sections.

2. *Medulloblastoma.* This migration was peculiar in that it had been in the form of a dense sheet of small mononuclear cells entirely similar to those present in the ordinary sections. No cells resembling any highly differentiated form were observed.

3. *Meningioma.* The migrating cells were indistinguishable from fibroblasts and, like them, stained vitally with trypan blue. This was a very active preparation, which continued to grow for twenty-four days, almost every cell in each implant migrating.

4. *The Ordinary Auditory Nerve Tumour.* Migration here was late and confined to a few extremely large, somewhat irregularly shaped cells containing one or at times two nuclei. Migration occurred only in a few preparations and did not permit of vital staining.

5. *Hæmangioblastoma of the Cerebellum.* As far as was known, the growth of this tumour had not otherwise been reported. Migration was sparse and confined to long streams of cells which were indistinguishable in appearance from fibroblasts. It was thought that in all probability these cells represented the actual tumour cells.

Finally, Dr. Cox said that, as the number of tumours yet grown was comparatively small, no definite conclusions had as yet been arrived at. It was, however, of interest to note that all meningiomata cultured had as yet shown migrating cells indistinguishable from fibroblasts.

Clinical Demonstration of Patients Treated by Radium and Deep X Ray Therapy.

DR. ALAN MACKAY, JUNIOR, showed a series of patients who had been treated either by radium or deep X ray therapy.

The first patient was a male, aged thirty-three years, who, when admitted to hospital for treatment for pulmonary tuberculosis, was found to have a small nodule under the left upper eyelid which had been present for from two to three years and which had recurred elsewhere after removal.

On September 29, 1934, the nodule was excised under local anæsthesia, and on October 30, 1934, a radium plaque was applied (10 milligrammes, half strength plaque, 0·5 millimetre lead screenage for one and a half hours). Radium treatment was repeated on November 22, 1934, and again on December 21, 1934. The pathological report on the nodule was: "*Epithelioma adenoides cysticum* (structure of adenocarcinoma)". There had been no recurrence.

Dr. Mackay's second patient was a male, aged seventy-six years, who was admitted to hospital on December 16, 1934, with a large ulcer on the vertex of the scalp, about 7·5 centimetres (three inches) in diameter and of about three years' duration, which was infiltrating bone. On December 18, 1935, the ulcer was excised with diathermy and the pathological report stated: "Rodent type of tumour, in parts suggestive of epithelioma cells." Deep X ray therapy was commenced on March 21, 1935, and 350 *r* units were given at intervals till August 27, 1935. The ulcer healed completely and there is now a soft scar.

Dr. Mackay then showed a female, aged forty-five years, who was admitted to hospital on July 30, 1933, with a history of a mass in the left breast of three years' duration, which had been treated elsewhere with radium; this woman had sustained a pathological fracture of the neck of the right femur one week before admission. X ray examination revealed metastatic carcinoma in the trochanteric portion of the right femur with a pathological fracture. Deep X ray therapy was given to the breast and femur at repeated intervals, and an X ray picture taken on May 22, 1934, showed firm bony union with sclerosis and regeneration of bone in the femur. The patient had been doing house work at home since that date and was given deep X ray therapy at intervals.

The next patient shown by Dr. Mackay was a female, aged forty-six years, who was admitted to hospital on November 15, 1935, with severe pain in the thoracic spine and pelvis following a radical mastectomy for carcinoma eight months previously. X ray examination revealed multiple metastases in the thoracic spine with collapse of the sixth thoracic vertebra and metastases in the pelvis. Deep X ray therapy was given and the patient was discharged on December 29, 1935, her condition being greatly improved. Deep X ray therapy had since been repeated at intervals and X ray pictures showed bony repair.

Dr. Mackay then showed a male, aged thirty-seven years, who was admitted to hospital on June 24, 1935, with a

history of a mass of enlarged glands in the left side of the neck, which had at first been regarded as tuberculous. At operation, performed elsewhere, the glands had been found to be matted, and the biopsy report stated: "Lymphadenoma — ? lymphosarcoma." On examination there was found a large indurated mass of glands in the neck, suggestive of Hodgkin's disease. The operation scar was healed. Other glands were not palpable and all other examinations revealed no abnormality. Deep X ray therapy was given and the mass became smaller; it had since been controlled by deep therapy.

Dr. Mackay's last patient was a female, aged forty-five years, who was admitted to hospital on August 20, 1935, with a history of three months' hæmaturia. Three weeks before admission a partial cystectomy and hysterectomy had been performed at the Royal Melbourne Hospital for an active carcinoma infiltrating the uterus posteriorly. On admission to the Austin Hospital the patient's general condition was poor and she had frequency of micturition. *Per rectum* a large hard mass was palpable on the right side of the rectum, but not adherent to it. Saturation deep X ray therapy was commenced on September 2, 1935, and a second series was commenced on October 21, 1935. The patient was then discharged and was now free of symptoms; she had put on 9·5 kilograms (one and a half stone) in weight.

Unsuspected Primary Carcinoma.

DR. A. J. TRINCA and DR. R. A. WILLIS presented a paper entitled "Primary Carcinoma Unsuspected by the Clinician" (see page 222).

British Medical Association News.

NOMINATIONS AND ELECTIONS.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Dorsch, Wilhelm Bernhard, M.B., B.S., 1933 (Univ. Adelaide), Broken Hill and District Hospital, Broken Hill.

Correspondence.

THE INFECTIVITY OF SYPHILIS.

SIR: I have been interested for many years in the problems connected with the above. It is well known that men have repeatedly exposed themselves to infection and appear never to have contracted syphilis. It is known that men have been infected by women with a negative blood Wassermann reaction and no sign of a lesion, but who had contracted syphilis; and it is also known that men have not contracted syphilis from women who have infected others, but contracted it later from other sources.

Now it appears to me that there are several types of the organisms causing syphilis, probably a result of the cultural evolution of the organism in the course of the ages. Thus the type that has given rise to the disease in a prostitute may not be infective to a number of men having relations with her, and it seems to me that the chances of infectivity are like that of gonorrhœa—about one in five. This includes lesional as well as serological syphilis. But with a prostitute it is impossible to say whether the man she infects has got the strain which has caused her disease or another which is harmless to her.

But it is in the female line that syphilis shows its vagaries. A woman with inherited disease married a man who lived to eighty years and never showed the slightest sign of having contracted syphilis. A blood Wassermann test was never taken. The eldest son is alive, aged seventy-five. He drank freely for many years and has never shown any sign of disease. There were six other children; three of these seemed to have escaped the disease and three died of it, two of them in an asylum. It was in the younger children it showed up. The mother died, aged about sixty-five, of cancer of the nose.

Now did these children inherit the father's resistance to that particular strain which caused disease in the others? I consider the whole family was infected and that those who took after the father didn't show the disease.

Yours, etc.,

300, Queen Street,
Brisbane,
July 3, 1936.

J. MORRIS ROE.

PRIMARY BRONCHOGENIC CARCINOMA.

SIR: With reference to the article on "Primary Bronchogenic Carcinoma", by Dr. Garnet Halloran, in this week's issue of the journal, and the subsequent discussion thereon, it would appear that while carcinoma of the lung may occur at any age, it is not a common disease in patients under thirty years of age.

A brief report of a case which was recently under my care might therefore be worth recording.

Patient, H.H., male, aged twenty-seven years, admitted to the Mater Misericordiæ Hospital, Waratah, on February 27, 1936 (from Dr. E. V. Bradfield, Belmont). There was a history of anorexia and flatulence for about two months past, with loss of weight of two stone. There was a cough of one week's duration, with slight, non-blood-stained expectoration and no pain in the chest.

In the early stages these symptoms had been considered as due to bad pyorrhœa, and the teeth were extracted; but as he continued to lose ground he was sent to the hospital for investigation. His stomach symptoms were his main complaint.

On examination the only definite signs were in the chest, and consisted of an area of dulness at the right base, with fine râles and crepitations at both bases.

An X ray of the chest on March 2, 1936, showed, in the antero-posterior view, an opacity about four by three inches in the right middle and lower lung zones, extending from the hilum to the mid-clavicular line. This was confirmed by lateral and oblique views. There were also doubtful signs of infiltration, extending upwards and outwards from the area of opacity, and of early infiltration extending from the hilum of the opposite lung.

The history, clinical signs and X ray appearances seemed to preclude the possibility of lung abscess. A tentative diagnosis of carcinoma was made. The X ray negatives were sent to Dr. M. Susman for his opinion.

A Casoni test on March 10, 1936 (delayed by having to wait for Casoni fluid) was negative, both in the immediate and delayed responses.

On March 17, 1936, a further X ray showed: "The opacity has increased in size and is spreading upwards and outwards." A barium meal examination of the stomach on the same date, on account of the predominance of gastric symptoms, showed the stomach and duodenum quite normal. A blood count showed slight anæmia with no leucocytosis or eosinophilia.

When I saw him on March 25, 1936, after having been away at the Royal Australasian College of Surgeons' annual meeting, he had developed a prominent, enlarged supraclavicular gland on the left side. On March 26, 1936, this was excised under local anæsthesia.

A bronchoscopic examination was carried out by Dr. A. B. K. Watkins, of Newcastle, on March 27, 1936, which showed some bulging into the outer aspect of the right middle bronchus. No growth was seen.

The pathological report of the gland excised, received on April 7, 1936, stated: "Sections show dense fibrous tissue, containing large areas of carcinomatous cells.

Very small areas of lymph-glandular tissue can be identified round the periphery of the tumour." This put the original diagnosis of carcinoma of the lung beyond all doubt, especially as by this time there had developed further extensive glandular swelling in the neck. He was discharged from hospital to the care of Dr. Bradfield on April 8, 1936.

During his stay in hospital, at no time was there any hæmoptysis or pain in the chest. His cough was not very troublesome, sputum was not excessive, and the gastric symptoms continued to be the main complaint.

After discharge from hospital Dr. Bradfield states that he continued to go down hill rapidly and died on June 12, 1936. No *post mortem* was obtained.

At no time, even when first provisionally diagnosed, was this case considered operable.

Yours, etc.,

OSWALD J. ELLIS, M.B., Ch.M.,
F.R.C.S. (Edin.), F.R.A.C.S.

Bank Chambers,
17, Bolton Street,
Newcastle,
July 7, 1936.

A WARNING.

SIR: I beg to draw the attention of hospital executives and resident medical officers of the metropolitan hospitals to an impostor who has frequently been an in-patient, alleged to be suffering from various conditions, including hæmatemesis, paralyses, anæsthesias and other hysterical manifestations.

A young woman, aged twenty-five years, was admitted to this hospital with the history of having, while in the out-patient department of another hospital, vomited a large quantity of "blood". She had also vomited whilst in the ambulance and continued to do so after admission. It was observed that, despite the large quantity of blood vomited, her pulse remained steady and her colour good. Microscopic examination of the vomitus did not reveal the presence of blood, and a blood count showed 4,500,000 red blood cells, hæmoglobin C1. On these findings it was assumed that the woman was an impostor and she was treated accordingly. A subsequent analysis of the vomitus revealed the presence of a colouring agent ("Primrose Red"), which can be purchased at about one shilling per ounce.

A *questionnaire* sent to the metropolitan hospitals revealed the fact that she had been treated by at least nine hospitals, mainly those within the eastern and northern suburbs of the metropolitan area.

It is of some interest to note the findings of these institutions:

Hospital A. Admitted at least six times in all, once under an alias: twice for hæmatemesis, twice for hysterical contractures of the left hand and paralysis of the left side of the body with hemi-anæsthesia. Her record is marked: "not to be re-admitted, except as the result of a serious accident".

Hospital B. Admitted three times, twice with hæmatemesis of unestablished origin and once with hysterical paresis of the left arm. It is of interest that on one occasion an examination of the fæces revealed "occult blood", but all other tests were negative.

Hospital C. Was admitted with hæmatemesis and remained nineteen days, leaving against medical advice. During this time she vomited "blood" (?) on three occasions.

Hospital D. Admitted with hæmatemesis and remained five weeks, when the fraud was discovered and she was summarily and suitably dealt with.

Hospital E. Admitted on several occasions with a history of hæmatemesis. During her stay in the institution no definite evidence of bleeding from the stomach could be found. During one stay in hospital she developed a left-sided hemiparesis and hemiplegia, which was diagnosed as hysterical. An X ray of her chest showed accessory cervical rib on the right side. It is reported that her anæsthesia and paralyses cleared up suddenly following the judicious use of a pin while she was asleep.

Hospital F. Admitted on two occasions with a history of vomiting and coughing up of blood, and was considered to be neurasthenic.

Hospital G. Admitted on four occasions, twice under an alias. On two occasions her symptoms were pelvic in nature, but she was apparently relieved by a tonsillectomy and a submucous resection of her septum, two teeth being extracted for good measure.

This case shows what gross imposition can be practised over long periods of time by an unscrupulous person, and it is annoying to think of the wasted time of honorary doctors, resident medical officers and technicians in investigation of a case such as this.

Yours, etc.,

O. W. MATER, M.B., Ch.M., D.P.H.,
Resident Medical Officer,
The Eastern Suburbs Hospital.

July 20, 1936.

Analytical Department.

"MEDCO" ANÆSTHETIC ETHER.

"MEDCO" anæsthetic ether is a product of Medicinal Chemical Corporation Limited, Sydney. A sample has been submitted to our analysts, who report as follows: The specific gravity at 15·5° C. is 0·720. The boiling point is 34° to 35° C. On evaporation 50 millilitres left a residue of 0·0003 gramme. No foreign odour was detectable on evaporation of ten millilitres. The sample passed the British Pharmacopœia (1932) limit tests for the following impurities: sulphurous and other free acids, peroxides, acetone and aldehyde, methyl alcohol. The ether conformed in all respects to the British Pharmacopœia (1932) specification for anæsthetic ether. It is well packed, being protected from light and sealed with a cork covered with tinfoil.

Obituary.

FREDERIC SIDNEY JERMAINE-LULHAM.

WE regret to announce the death of Dr. Frederic Sidney Jermaine-Lulham, which occurred on July 23, 1936, at Brighton, Victoria.

JOHN REGINALD DAVIS.

WE regret to announce the death of Dr. John Reginald Davis, which occurred on July 24, 1936, at Westbury, Tasmania.

JAMES JOSEPH FITZGERALD BOURKE.

WE regret to announce the death of Dr. James Joseph Fitzgerald Bourke, which occurred on August 6, 1936, at Randwick, New South Wales.

Books Received.

VASCULAR DISORDERS OF THE LIMBS DESCRIBED FOR PRACTITIONERS AND STUDENTS, by T. Lewis, C.B.E., F.R.S., M.D., D.Sc., LL.D., F.R.C.P.; 1936. London: Macmillan and Company Limited. Demy 8vo, pp. 122. Price: 6s. 6d. net.

INDIVIDUAL PSYCHOLOGY: THEORY AND PRACTICE, by C. M. Bevan-Brown, G. E. S. Ward and F. G. Crookshank (Individual Psychology Medical Pamphlets, Number 15); 1936. London: The C. W. Daniel Company Limited. Demy 8vo, pp. 79. Price: 2s. 6d. net.

CLINICAL HEART DISEASE, by S. A. Levine, M.D., F.A.C.P.; 1936. Philadelphia: W. B. Saunders Company; Melbourne: W. Ramsay. Royal 8vo, pp. 445, with illustrations. Price: 32s. 6d. net.

A HANDBOOK OF UROLOGY FOR STUDENTS AND PRACTITIONERS, by V. Pennell, M.A., M.B., B.Chir., F.R.C.S.; 1936. Cambridge: The University Press; Melbourne: S. Jaboor. Crown 8vo, pp. 232, with illustrations. Price: 7s. 6d. net.

MENTAL NURSING (SIMPLIFIED), by O. P. Napier Pearn, M.R.C.S., L.R.C.P., D.P.M.; Second Edition; 1936. London: Baillière, Tindall and Cox. Crown 8vo, pp. 312, with illustrations. Price: 5s. net.

A STUDY OF MASTURBATION AND THE PSYCHOSEXUAL LIFE, by J. F. W. Meagher, M.D., F.A.C.P.; Third Edition; reedited and revised by S. E. Jelliffe, M.D., Ph.D.; 1936. London: Baillière, Tindall and Cox. Crown 8vo, pp. 162. Price: 8s. 6d. net.

SYMPTOMS AND SIGNS IN CLINICAL MEDICINE: AN INTRODUCTION TO MEDICAL DIAGNOSIS, by E. N. Chamberlain, M.D., M.Sc., M.R.C.P., with a chapter on the Examination of Sick Children, by N. B. Capon, M.D., F.R.C.P.; 1936. Bristol: John Wright and Sons Limited. Royal 8vo, pp. 435, wtih 282 illustrations, of which 17 are in colour. Price: 25s. net.

A MANUAL OF PRACTICAL OBSTETRICS, by O'D. Browne, M.B., B.Ch., B.A.O., F.R.C.P.I., L.M., M.C.O.G.; 1936. Bristol: John Wright and Sons Limited. Royal 8vo, pp. 363, with 236 illustrations and 10 plates. Price: 20s. net.

Diary for the Month.

AUG. 18.—New South Wales Branch, B.M.A.: Ethics Committee.
AUG. 18.—Tasmanian Branch, B.M.A.: Council.
AUG. 19.—Western Australian Branch, B.M.A.: Branch.
AUG. 20.—New South Wales Branch, B.M.A.: Clinical meeting.
AUG. 24.—Federal Council.
AUG. 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.
AUG. 26.—Victorian Branch, B.M.A.: Council.
AUG. 27.—South Australian Branch, B.M.A.: Branch.
AUG. 27.—New South Wales Branch, B.M.A.: Branch.
AUG. 28.—Queensland Branch, B.M.A.: Council.
SEPT. 1.—Tasmanian Branch, B.M.A.: Council.
SEPT. 2.—Western Australian Branch, B.M.A.: Council.
SEPT. 2.—Victorian Branch, B.M.A.: Branch.
SEPT. 3.—South Australian Branch, B.M.A.: Council.
SEPT. 4.—Queensland Branch, B.M.A.: Branch.
SEPT. 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.
SEPT. 8.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 9.—Tasmanian Branch, B.M.A.: Branch.
SEPT. 11.—Queensland Branch, B.M.A.: Council.
SEPT. 15.—New South Wales Branch, B.M.A.: Ethics Committee.
SEPT. 15.—Tasmanian Branch, B.M.A.: Council.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xvi-xviii.

BROKEN HILL AND DISTRICT HOSPITAL, BROKEN HILL, NEW SOUTH WALES: Resident Medical Officer.
DIRECTOR-GENERAL OF PUBLIC HEALTH, SYDNEY, NEW SOUTH WALES: Honorary Ophthalmic Surgeon.
DIRECTOR-GENERAL OF HEALTH, CANBERRA, F.C.T.: Medical Officer.
LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer.
PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Resident Registrar.
PUBLIC SERVICE BOARD, SYDNEY, NEW SOUTH WALES: Junior Resident Medical Officers.
QUEEN'S MEMORIAL INFECTIOUS DISEASES HOSPITAL, FAIRFIELD, VICTORIA: Junior Resident Medical Officer.
THE PRINCE HENRY HOSPITAL, SYDNEY, NEW SOUTH WALES: Medical Superintendent.
THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY, NEW SOUTH WALES: Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY Hospital are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

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